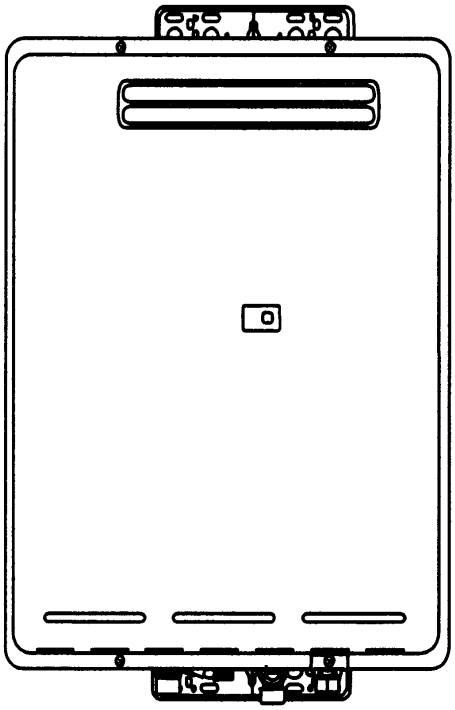
Installation and User Manual

Infinity 16e



Continuous Flow Water Heater

Important.

Read these instructions carefully before attempting installation or use of this appliance. All work must be carried out by competent persons.

RINNAI UK WARRANTY

As the purchaser of this high quality Rinnai Water Heater you are provided with the following conditional guarantee.

	Heat Exchanger		All Other Parts	
	Parts	Labour	Parts	Labour
Standard Use	3 Years	1 Year	3 Years	1 Year
16e				
Commercial Use	1 Year	1 Year	1 Year	1 Year
16e				

Definition of Standard Use.

The warranty period allocated under Standard Use is based on Domestic and Light Commercial hot water usage. Rinnai Standard Use warranty periods apply only where Rinnai water heaters are installed in domestic and light commercial situations at operating temperatures below 65^0C and do not include installations incorporating storage cylinders or building flow and return systems.

The warranty shall apply to any Rinnai water heater from the Infinity range used in this way.

Definition of Commercial Use.

The warranty period allocated under Commercial Use are for Infinity water heaters installed at premises such as commercial and industrial buildings, cafes, caravan parks, and sporting complexes. Commercial Use warranty applies to:

Water heaters supplying a central shower block
Water heaters supplying kitchens used for the bulk preparation of food.
Water heaters set to 65^0C or higher.
Water heaters used in commercial or industrial processes.
Any application that uses Rinnai water heaters in conjunction with storage tanks
Any application that uses Rinnai water heaters in conjunction with a flow / return system.
Water heaters installed as components of centralised bulk hot water systems.

Rinnai Infinity units used in Commercial Situations are only subject to a 1 year warranty across the board. Commercial situations should be supplied by the Rinnai HD range.

No Rinnai warranty will cover faults arising from improper installation or gas supply, water contaminants beyond defined limits, environmental factors, plumbing fittings, or other outside influences of which Rinnai is not responsible. Service calls for these issues will be chargeable.

Description	pH	Total Dissolved Solids (TDS)	Total Hard-ness	Chlorides	Magnesium	Calcium	Sodium	Iron
Maximum Recom-mended Levels	6.5 - 9.0	600 mg/litre	200 mg/litre	300 mg/litre	10 mg/litre	20 mg/litre	150 mg/litre	1 mg/litre

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UNPACKING RINNAI WATER HEATER

- After unpacking the appliance check for damage, if the heater is damaged contact your supplier immediately. Do not install a damaged appliance before checking with your supplier.
- One remote control and heater accessories pack are inside the carton.
- Check that the appliance supplied is the correct gas type for the installation. Refer to the data plate located on the left-hand side of the appliance.
- Remove the heater and the accessories from the carton, and check that all the parts are included . The remote control cable is provided with spade connectors.

Remote Control Parts

Quantity	Diagram	Description
1		Temperature controller MC-91-1A
1		Cable clamp
1		Cable Clamp
5		Spade connectors
1		Control cable 20 metres
1		Clamp screw

Unit Mounting Fasteners

Quantity	Diagram	Description
5		Screw
5		Screw

INSTALLATION INSTRUCTIONS

IMPORTANT INFORMATION

1. **Gas safety (Installation & Use) regulations 1998** are the 'Rules in force'. In your own interest and that of safety, it is law that all gas appliances are installed by competent persons in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. Other persons should NOT attempt to install this equipment.

2. Unpack the appliance and check it carefully. If it appears to have any defects or damage DO NOT INSTALL, contact your supplier.

3. This appliance is for normal hot water supply only and should not be used as pool or spa water heater.

4. The heater must be installed in the vertical position with the gas and water connections on the underside pointing vertically downward.

5. Installation must be carried out in accordance with the current issue of the following:

   Building regulations issued by the Department of the Environment and
   Building Standards (Scotland) Regulations.
   I.E.E. Wiring regulations for electrical installations.
   Gas safety (Installation and Use) Regulations current issue.
   BS 5546
   BS 5440
   BS 6891
   BS 5482
   BS 6700
   Local byelaws
   Water regulations
   Health and safety at work etc. Act 1974

   Such other specifications and regulations that may supersede or complement the above documents.

Please be sure that you are fully aware of your obligations and responsibilities under these regulations.

INSTALLATION INSTRUCTIONS - POSITIONING

General Installation Information.

External Installations.

The Rinnai Infinity 16e is for external mounting only.

The unit is classed as a Category A3 flueless appliance as described by CEN CR1749. Although BS 5440 does not relate directly to heaters in this category the rules must be followed when positioning the appliance, especially with regard to other appliances, openings, and boundaries. Figure C.1 from BS5440-1:2000 is provided for your guidance.

The appliance must be mounted on a vertical wall or structure with the water and the gas connections on the underside pointing towards the ground.

THIS APPLIANCE MUST NOT BE USED AS A DOMESTIC SPA OR SWIMMING POOL HEATER.

Appliance Location.

The appliance should be placed as close as practicable to the most frequently used hot water outlet point or points to minimise the delay time for hot water delivery. For installations where the distance between the unit and hot water outlet points is considerable, the appliance can also be fitted in a 'flow and return system' which minimises the waiting time for hot water delivery. Alternatively, multiple appliances can be strategically placed to service outlet points with minimal delay time. Contact Rinnai for further information.

Location of the appliance flue terminal must be in accordance with the clearances shown on page 8. Ensure that the flue terminal and hot water outlet connection cannot be touched by children. The appliance must be clear of obstructions and shrubbery.

The wall or structure on which it is mounted must be capable of supporting the weight of the appliance (15 kg) and associated pipework. Ensure that suitable screws or bolts are used to secure the water heater to the wall. Bracket and fixing hole locations are shown on page 9. The top bracket has a keyhole slot so that the appliance can be hung on one screw, and then the other fixings can be added to secure the unit.

The appliance must be in an accessible location. Sufficient clearances shall allow access to, and removal of, all serviceable components. The appliance should not be mounted higher than 3.5 metres from the ground or floor level unless the customer can arrange permanent and safe access or can arrange another means of access, for example, by means of scissor or boom lifts.

Multiple heater installations can be installed with the heaters manifolded together.

The heater draws combustion air through the casing for the external model.

Heater guards and pipe cover boxes for security and safety are available from Rinnai.

INSTALLATION INSTRUCTIONS - CONNECTIONS

Water Supply.

Where the water supply pressure exceeds 10 bar, an approved pressure reducing device is required at the inlet of the appliance. To achieve the rated flow a minimum water supply pressure of 0.8 bar is required at the appliance inlet. The unit will operate at lower supply pressures but the rated flow will not be achieved. Contact Rinnai for 'gravity fed' or 'low pressure' hot water installations.

Water pipe sizing and layout should be designed correctly to ensure the given water flows from the Rinnai Infinity are available. All hot water pipework should be insulated to optimise maximum performance and energy efficiency.

Water Connection.

Connect the hot and cold water supply pipes. An approved isolation valve and strainer MUST be installed in the cold water inlet pipe. An approved isolation valve should be installed in the hot water outlet pipe. There must be a union or release fitting on the heater side of the isolation valves. A non return valve is not required unless dictated by local regulations. A pressure relief valve should be installed in the pipework to discharge safely into a suitable drain if used in a flow and return configuration.

Position of the cold water inlet, hot water outlet and gas connection is shown on page 9. Water connections are 1/2 inch BSP, gas is 3/4 inch BSP. This is NOT an indication of the pipe sizes required.

If the heater is in a hard water area a suitable water conditioning device should be installed to prevent the build up of limescale within the heat exchanger. Heat exchangers damaged by scaling are not covered by the manufacturers guarantee. Guidelines are given below. If the local water exceeds these values the heater must be protected.

Description	pH	Total Dissolved Solids (TDS)	Total Hardness	Chlorides	Magnesium	Calcium	Sodium	Iron
Maximum Recommended Levels	6.5 - 9.0	600 mg/litre	200 mg/litre	300 mg/litre	10 mg/litre	20 mg/litre	150 mg/litre	1 mg/litre

Gas Connection

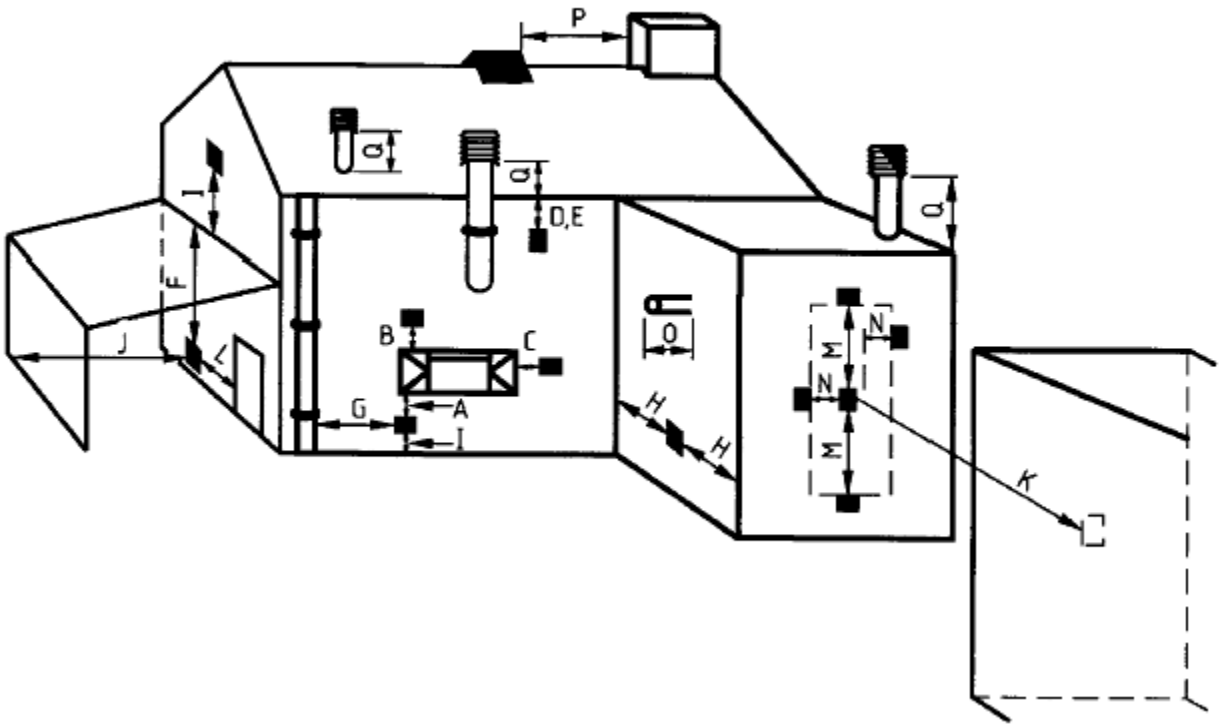
Check pipe sizing required for the heater input. The heat input for the Infinity 16e is 34.7 kW. Refer to BS6891 (Natural Gas) and BS5482 (Propane) for guidance on correct pipe sizing calculation.

Check that the size of the gas meter and pipework will be sufficient for all appliances on the main. Sufficient gas must be available at the appliance if correct operation is to be expected. An approved gas isolation valve must be fitted at the gas inlet. A union or release fitting should be installed after the isolation valve.

Electrical Connection.

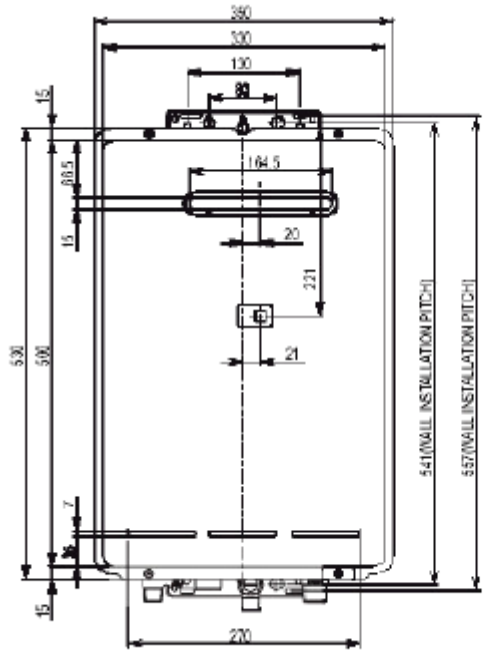
The appliance must be earthed. The appliance is suitable for 230VAC – 50hz mains only and all wiring must be carried out to the I.E.E regulations latest edition. The heater electrical supply must be provided with a fused (3A) local isolator with a contact separation of 3mm minimum on all poles for servicing. Observe polarity and ensure that wiring is correctly restrained.

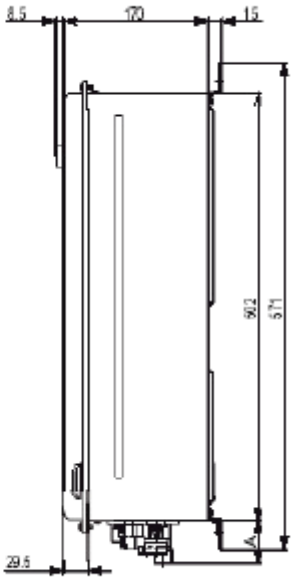
FLUE REQUIREMENTS - POSITIONING

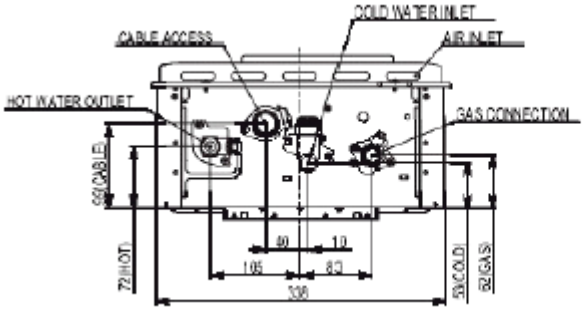


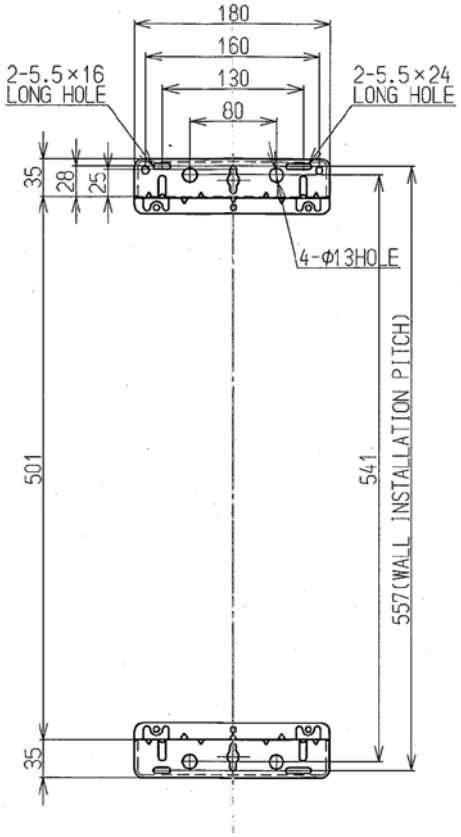
Dimension	Terminal Position	Distance
A	Directly below an opening, air brick, opening windows, etc.	300mm
B	Above an opening, air brick , opening window, etc.	300mm
C	Horizontally to an opening, air brick , opening window, etc.	300mm
D	Below gutters, soil pipes or drain pipes.	75mm
E	Below eaves.	200mm
F	Below balconies or car port roof.	200mm
G	From a vertical drain pipe or soil pipe.	150mm
H	From an internal or external corner.	200mm
I	Above ground, roof or balcony level.	300mm
J	From a surface facing the terminal.	600mm
K	From a terminal facing a terminal	1200mm
L	From an opening in a car port. (e.g. door, window) into a dwelling	1200mm
M	Vertically from a terminal on the same wall.	1500mm
N	Horizontally from a terminal on the same wall.	300mm
O	From the wall on which the terminal is mounted	N/A
P	From a vertical structure on the roof.	N/A
Q	Above an intersection with roof.	N/A

DIMENSIONS









(mm)

	A DIMENSION
GAS	40
COLD	50
HOT	39
CABLE ACCESS	26

TECHNICAL DETAILS

Infinity Model	**Infinity 16e**	Units
Installation	External	
Nat Gas Press Low	1.8	mbar
Nat Gas Press High	8.8	mbar
LPG Press Low	1.8	mbar
LPG Press High	8.1	mbar
Height	530	mm
Width	350	mm
Depth	170	mm
Weight	15	kg
Flue System	Forced Exhaust	
Temp. Range Controllers	37 - 75	deg C
Temp. Range without Controllers	37,40,43,50, 55*,65,75	deg C
Ignition	Direct Electronic	
Gas Consumption Low		
Nat Gas	5.2	kW
LPG	5.0	kW
Gas consumption High		
Nat Gas	34.7	kW
LPG	34.7	kW
Max Flow raised 33C	12	L/min
Min Operation Flow	2.4**	L/min
Water Pressure Nom.	0.8 - 10	bar
Power Supply	230 V / 50 Hz	
Electric Consumption	74	Watts

* Factory Setting
**Minimum operation flow based on temperature setpoint and inlet conditions.

FEATURES AND BENEFITS

Congratulations on purchasing the Technologically Advanced, Temperature Controlled, Rinnai Hot Water System.

- The Rinnai **Infinity 16e NEVER RUNS OUT** of hot water. As long as electricity, water, and gas supplies are connected, hot water is available when hot water taps are open.
- Built into the main micro-processor is the facility to **LIMIT THE MAXIMUM TEMPERATURE** of the hot water supplied. The water temperature may be limited to various maximum temperatures. This is particularly useful when the hot water unit is installed where young children or the infirm may be using the hot water. The Infinity 16e is delivered with a preset temperature of 55^0C. If required, the temperature limits can be changed by an authorised person. For further information, please contact Rinnai.
- The Rinnai Infinity external unit is a powered flue appliance. This makes it **COMPACT**, saving both floor and wall space.
- The temperature of outgoing hot water is **CONSTANTLY MONITORED** by a **BUILT-IN SENSOR**. If the temperature of the outgoing hot water rises to more than 3°C above the selected temperature the burner is shut OFF and only turned ON again when the temperature falls to below the selected temperature.
- The burner lights automatically when the hot water tap is opened, and distinguishes when the tap is closed. **IGNITION IS ELECTRONIC**, so there is no pilot light. When the hot water tap is off, no gas is used.
- Up to three temperature controllers can be mounted remotely from the heater. This offers the following additional features:
  Localised temperature setting.
  Diagnostic message.
- 'Deluxe' Temperature Controllers are an optional extra. These provide functions including Bath Fill, Voice Prompt, and Clock Setting.
- Temperatures selected at the controllers are retained in the **SYSTEM MEMORY**.
- Operating **NOISE LEVEL IS VERY LOW**.
- **ERROR MESSAGES ARE DISPLAYED** on the Temperature Controllers, assisting with service.
- **FROST PROTECTION** device built in as standard.

IMPORTANT INFORMATION

Excessively hot water is dangerous, especially for young children and the infirm. The water heater allows you to control the temperature of your hot water to safe levels.

Water temperature over 50ºC can cause severe burns instantly or even death from scalding.

Children, disabled and the elderly are at the highest risk of being scalded by excessively hot water.

Always test the temperature of the water before bathing or showering.

Burns from hot water taps can result in very severe injuries to young children.

Hot water at 65°C can severely burn a child in less than half a second. At 50°C it takes five minutes.

Burns can occur when children are exposed directly to hot water or when they are placed into a bath which is too hot.

DO

Do stay with children whenever they are in the bathroom.

Do take them out of the bathroom if you need to answer the phone or door.

Do test the temperature of the water with your elbow before placing your child in the bath.

Do make sure that the tap is turned off tightly.

Do consider setting your Rinnai Infinity 16e at a maximum temperature of 50^0C.

Do install a child proof tap cover

OR,

Do install a child resistant tap.

- **Consider child—resistant taps or inexpensive tap covers,** both of which prevent a child's hand from turning on the tap.
- **Consider reducing the temperature of the water supplied to the hot tap to 50^0C.**

  This approach can be extremely valuable because it requires a one time action for a long term reduction in risks of scalds. This type of automatic protection is important during times when a parent or carer has been distracted.

DO NOT

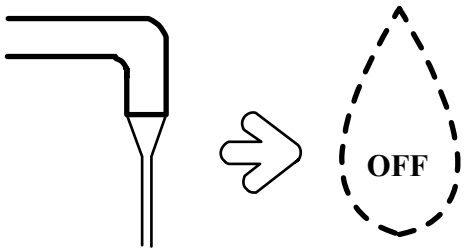
Do not leave a toddler in the care of another small child. The older child may not have safely set the temperature.

IMPORTANT INFORMATION

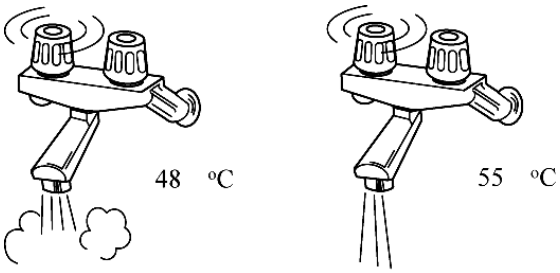
Always check water temperature before use.

Refer to warning about hot water on page 12 for important safety information.

Hot water may go out without warning at low water flows.



The **Infinity 16e** controls the water temperature automatically. For high temperatures it may reduce the flow. The water from the hot tap may be reduced after the temperature shown on the remote control is raised. The water flow may also vary with the temperature of the incoming water supply.



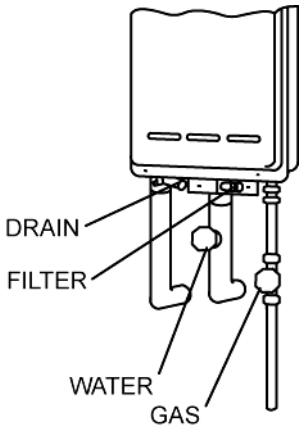
If freezing temperatures are expected, turn off the water and gas, and drain the water heater.

1. Water Off

2. Gas Off

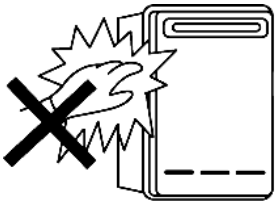
3. Drain Water

If the power is left on the Automatic Frost Protection will prevent the unit from Freezing. Frost protection is standard on the external units.



Keep flammable materials, trees, shrubs, chemicals etc. away from the heater.

Do not touch the unit cover or the flue outlet. Do not insert objects into the flue outlet.



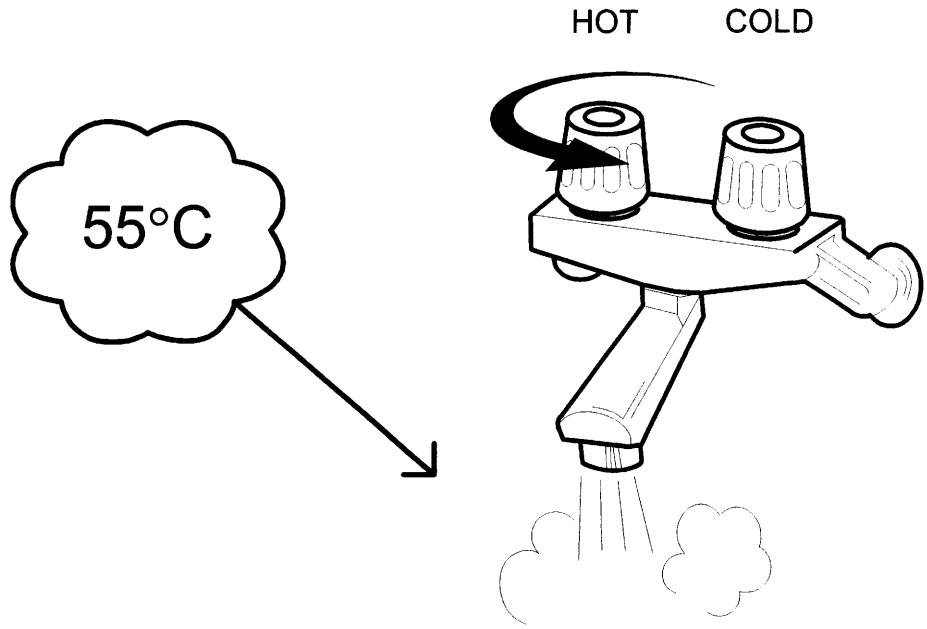
On cold days steam may be discharged from the flue outlet. This is normal, do not be alarmed. It does not indicate a fault.

OPERATION WITHOUT REMOTES

Rinnai Infinity products have no pilot light and when installed without Temperature Controllers, the appliance will operate automatically as soon as a hot water tap is opened.

The burner ignites with electronic ignition and the flame extinguishes as soon as water flowing through the appliance stops.

Turn On by opening the hot water tap



Rinnai Infinity water heaters without controllers are factory pre-set to a temperature limit of 55°C. Other limits, lower or higher, are available on request for the Infinity range. Temperature controllers are available that allow precise digital temperature control. Higher temperatures may be necessary for circulation loop systems.

Controllers can be easily added at any time after installation.

TEMPERATURE CONTROLS - GENERAL

When deciding on the best position for the temperature controls, the following points should be taken into account.

- Fit the controls out of reach of children (suggested height from the floor 1.5m.)
- Avoid positions where the controllers will become hot. Do not fit them near stoves or ovens, or above radiators or heaters.
- If possible, avoid exposure to direct sunlight or positions where bright lights will make the digital display difficult to read.
- Position away from areas where the controller will be prone to splashing by cooking products such as oils and fats.
- The temperature controllers are water resistant, however they should be positioned away from areas where direct or persistent splashing could occur.
- Refer to the I.E.E electrical wiring regulations current edition for location requirements in shower and bath areas.
- The cables to the temperature controller carry only 12VDC (extra low voltage.)
- When using more than one temperature controller the signal cable should be run in parallel. That is, from controller to controller to heater, or from each controller to the heater. Do not wire the controllers in series.

The installation in every application will vary, therefore the temperature controller cable has been provided so that you may cut the length accordingly and fit the spade connectors, ensuring a good connection.

Cables are simply ‘piggy-backed’ at the water heater or at the primary temperature controller. Polarity is not important when connecting the cables, either colour wire can be connected to either terminal at both the heater or primary temperature controller. If more cable is needed any cable with similar specification to the cable supplied with the controller can be used. Maximum length is 50 metres.

TEMPERATURE CONTROLS - INSTALLATION

Universal Temperature Controller

MC-91-1A

1. Determine the most suitable position for the temperature controller.

2. Drill 3 holes in the wall as shown in fig. 1, one for the cable and two for the securing screws. Ensure holes are drilled deep enough. Fit wall plugs if needed. (ensure controller is level.)

3. Run the cable provided through the hole in the wall ensuring that the end fitted with the connector is nearest the controller. (fig. 2.)

4. Remove the face plate from the controller using a flat screwdriver. Take care not to damage the cover (fig. 3.)

5. Connect the cable to the temperature controller.

6. Fix the controller to the wall and fasten with the phillips head screws supplied as shown in (fig. 4.)

7. Remove the protective plastic film from the controller face as shown in fig. 4.

8. Replace the face plate.

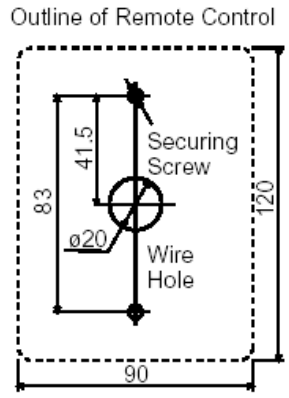


fig.1

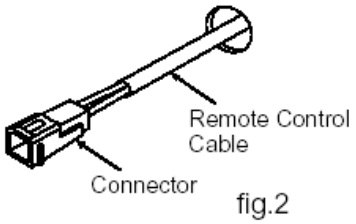


fig.2

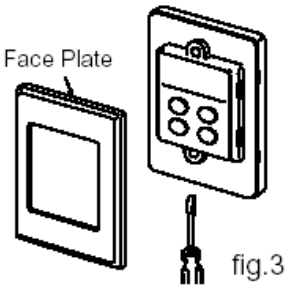


fig.3

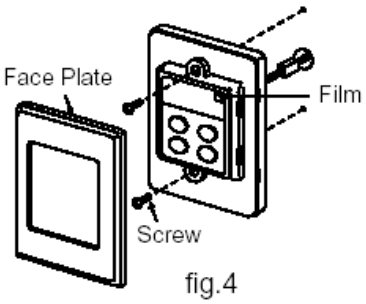


fig.4

TEMPERATURE CONTROLS - INSTALLATION

Connecting One or Two Controllers

1. Isolate the power supply.

2. Remove the front cover from the Appliance (4 screws) fig. 1.

3. Thread the cable through the cable access hole at the base of the appliance.

4. Connect the spade connectors to the terminals marked "Remote Control" on the printed circuit board (fig.2). Polarity is not important. Either wire colour can be connected to either terminal.

5. Replace cover of the Appliance. Ensure that the special earth screw is placed at the bottom right hand corner for earthing purposes.

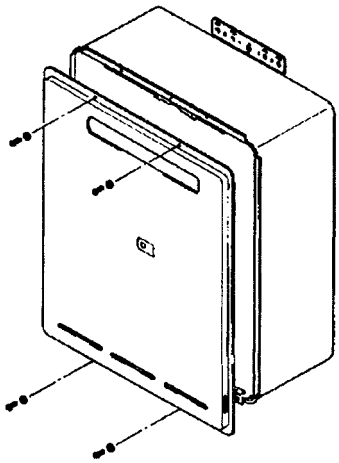


fig.1

Connecting Three Controllers

1. Isolate the power supply.

2. Remove the front cover from the Appliance (4 screws) fig.1.

3. Thread the cables through the cable access hole at the base of the appliance.

4. Cut the spade connectors from two controller cables (4 connectors should be cut off) and discard. Connect the wires and terminate into two new spade connectors as shown in fig. 3.

5. Thread the 3 cables through the cable access hole at the base of the appliance. Connect the 4 spade connectors to the terminals marked “Remote Control" on the printed circuit board (fig.2). Polarity is not important. Either wire colour can be connected to either terminal.

6. Replace cover of the Appliance. Ensure that the special earth screw is placed at the bottom right hand corner for earthing purposes.

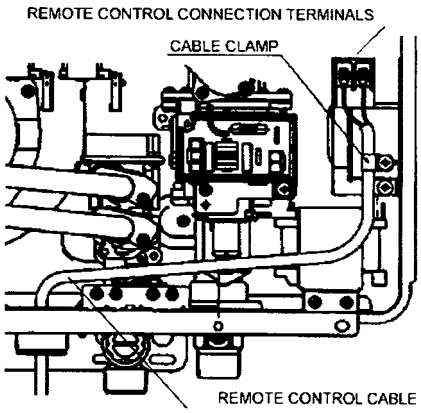


fig.2

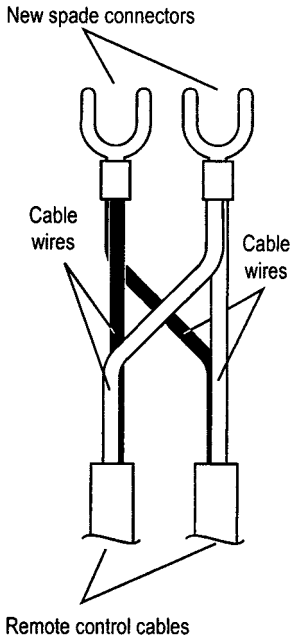


fig. 3

TEMPERATURE CONTROLS

The purpose of a Temperature Controller is to enable the user to have complete control over the hot water supply. Used correctly, the hot water unit will supply hot water at the temperature selected, even when the water flow is varied, or when more than one tap is used. Adjustments to the operation of your hot water unit can be made with any of the Temperature Controllers. Each Temperature Controller can be individually programmed.

Up to three Universal and Deluxe Temperature Controllers can be fitted with the Infinity 16e. Universal Controllers allow temperature selection only and come as standard with the water heaters. Deluxe Temperature Controllers are an optional extra. These controllers have temperature selection, bath fill, voice recognition, and time clock functions. When more than one Universal Controller is used one may be set as the Master Controller to allow higher temperatures.

Various water temperatures (°C) can be selected as follows:

Universal Controller:

37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50^0C

Master Universal Controller:

37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50, 55, 60, 65°C

Deluxe Bathroom Controller:

Hot Water Delivery: 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50°C

Bath fill Delivery: 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48°C

Deluxe Kitchen Controller:

37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 50, 55, 60, 65°C

If a temperature 43°C or higher is selected on any controller and this temperature is then decreased to below 43°C and increased again whilst the water is running, the maximum selectable temperature will become 43°C. This provides additional safety for the consumer.

Suggested temperatures are:

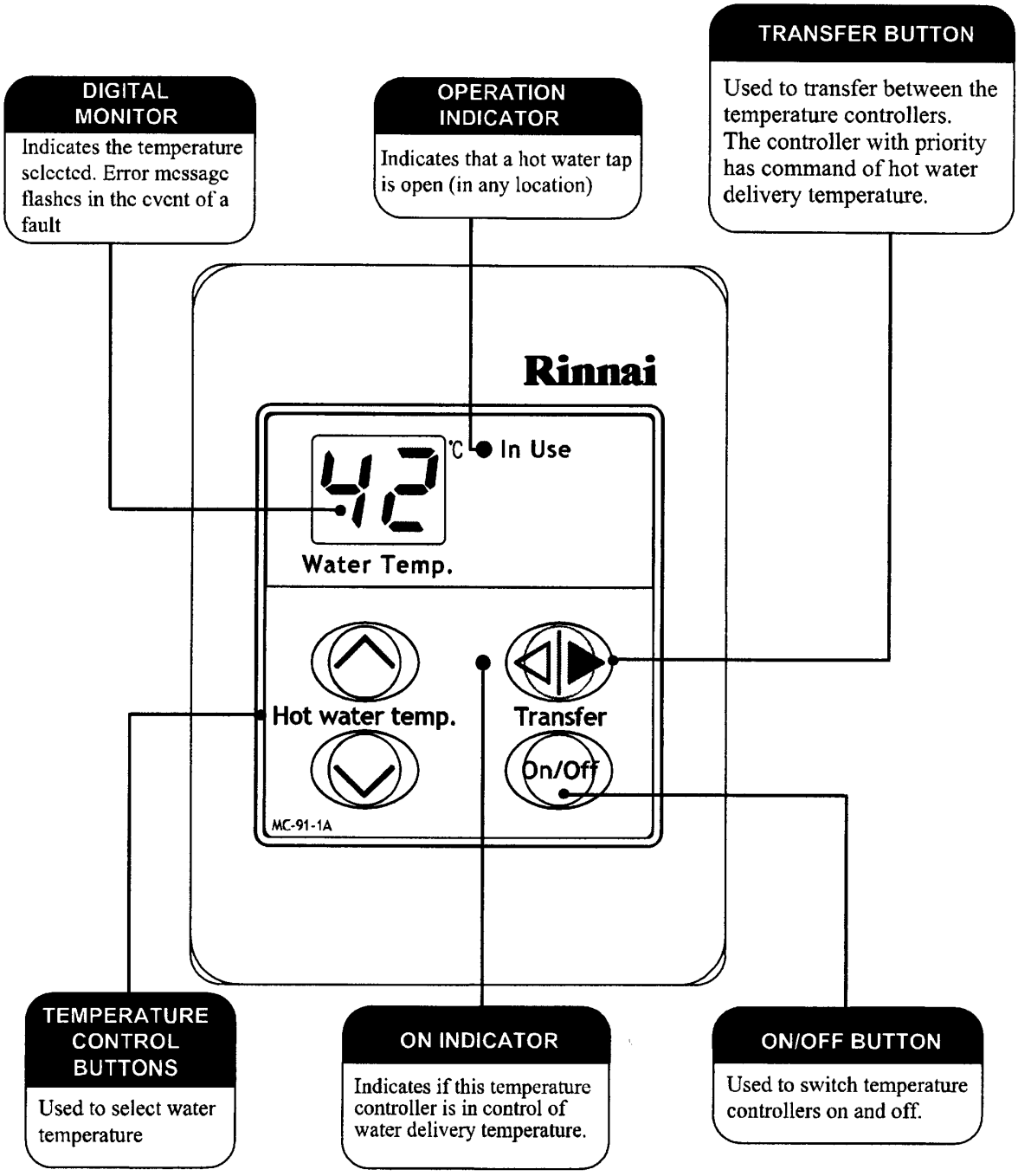
Kitchen 50°C - 65°C*; Shower 39°C - 43°C; Bath fill 39°C - 45°C
** This temperature may not be available on all installations.*

These temperatures are suggested starting points for selection. You may find higher or lower temperatures are more comfortable. Maintaining lower temperatures helps to save energy. To obtain water temperatures lower than 37°C simply add cold water.

Up to three controllers can be used for one Infinity 16e. When multiple temperature controllers are used they allow the temperature to be set from various locations by pushing the transfer button which gives that controller priority over the system. The temperature selected by the controller with priority will be available to all outlets.

TEMPERATURE CONTROLS - OPERATING

Remote temperature controllers are a feature that provides control over the water temperature. Rinnai Infinity water heaters can be operated with 1, 2, 3 or no temperature controllers. The Universal controller MC-91-1A comes as standard with all Infinity water heaters.

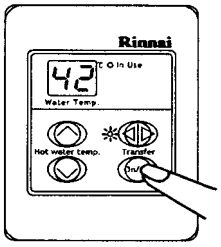

DIGITAL MONITOR
Indicates the temperature selected. Error message flashes in the event of a fault
OPERATION INDICATOR
Indicates that a hot water tap is open (in any location)
TRANSFER BUTTON
Used to transfer between the temperature controllers. The controller with priority has command of hot water delivery temperature.
Rinnai
42
℃
In Use
Water Temp.
Hot water temp.
Transfer
On/Off
MC-91-1A
TEMPERATURE CONTROL BUTTONS
Used to select water temperature
ON INDICATOR
Indicates if this temperature controller is in control of water delivery temperature.
ON/OFF BUTTON
Used to switch temperature controllers on and off.

NOTE:
Each time a button is pressed, a BEEP will sound.
The BEEP sound can be muted by depressing the Temperature Controller Up and Down buttons simultaneously for more than 3 seconds.
This can be done for each Temperature Controller.
To return to original settings, repeat this step.

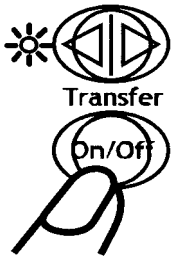
TEMPERATURE CONTROLS - OPERATING

Using 1 Universal Temperature Controller.

Press the **On/Off** button on the temperature controller.

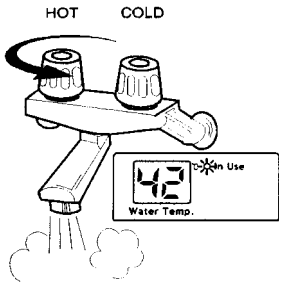


The ON indicator will glow on the Temperature Controller. This indicates that the heater is ready to supply hot water when a tap is opened.

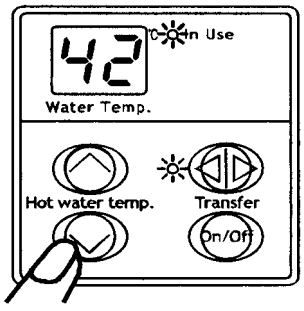


Adjusting Temperature

Simply press the Hot Water Temperature Up or Down arrow button until the desired temperature is displayed on the digital display.



To operate the heater, simply turn any hot water tap on. This will automatically light the burner providing hot water. The red **In Use** indicator will glow on the temperature controller.



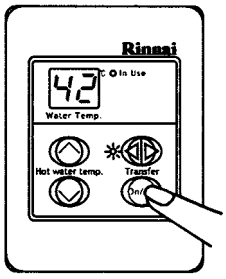
Caution: Always check water temperature before use.

Note: With the hot water tap open and a temperature of 43^0C or higher selected, if the temperature is decreased below 43^0C, and then raised again the maximum available temperature will be 43^0C. For safety reasons temperature 'priority' cannot be transferred between controllers when a hot water tap is open.

TEMPERATURE CONTROLS - OPERATING

Using 2 or more Universal Temperature Controllers.

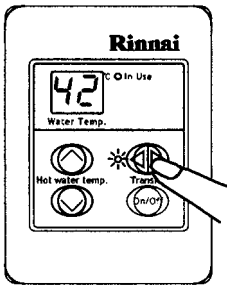
Switching the system ON.



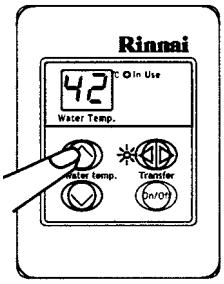
The hot water system and all controllers can be switched ON and OFF from any controller by pressing the **On/Off** button as shown. When the system is turned ON the water temperature display will be lit.

During normal operation the system is left ON. Do not push the **On/Off** button when water is running.

Using hot water.

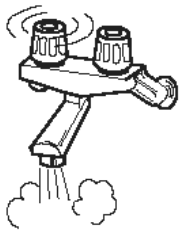


Ensure the system is switched **On** by verifying the temperature display is lit. Ensure the controller has priority by verifying the **Transfer** LED indicator is lit. If it is not then press the **Transfer** button once. This gives the local controller priority of temperature over the system.

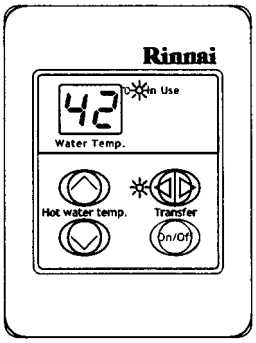


Select the desired temperature using the **Hot water temp.** buttons. The selected temperature will be displayed on all controller displays. This is the water temperature which will be supplied from the heater.

Bathroom temperatures should be no more than 50^{0}C.



Open the hot water tap. The appliance will be activated and the **In Use** indicator will be lit.



TEMPERATURE CONTROLS - OPERATING

Using High Temperature Display Controllers.

You will need to program the Master controller if you want to display and use temperatures over 50^0C. Programming only needs to be done on Master universal controllers; other universal controllers will not allow this, and Deluxe Kitchen Controllers are supplied already programmed to allow high temperatures. Temperatures in bathrooms should never exceed 50^0C.

STEP 1: On the Master controller only press and hold the **Transfer** and **On/Off** buttons simultaneously (see fig 2.) until a “beep” is heard (approx. 5 seconds)

STEP 2: When the Primary controller is switched on it should be possible to select temperatures higher than 50ºC. If not repeat STEP 1.

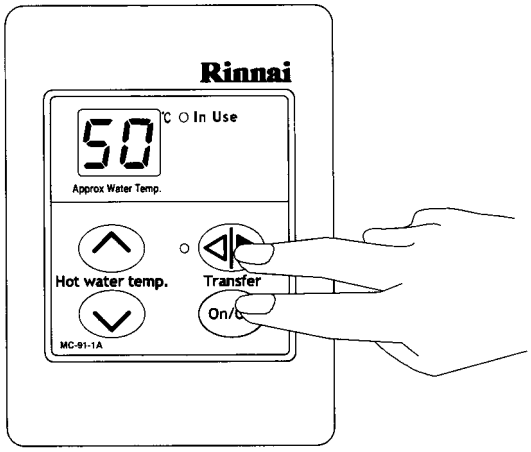


Fig 2.

Note:

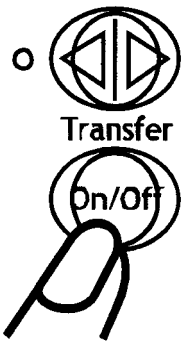
If the master controller is replaced, repeat STEP 1 above for the new controller.

TEMPERATURE CONTROLS - OPERATING

To turn off your hot water system.

During normal operation the system is left on.

To turn the system off simply press the **On/Off** button on any temperature controller (where fitted). This will shut the water heater down completely including the temperature controller digital display.

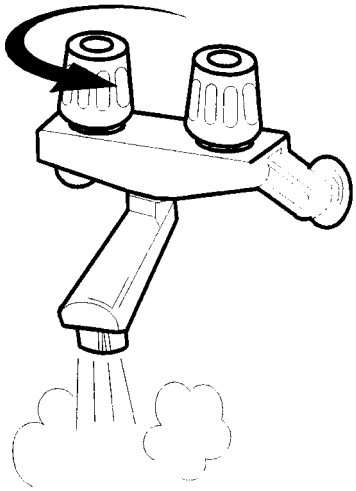


The on indicator will go out.

If hot water taps are opened when the Rinnai Infinity is off, cold water will flow from the taps.

If the system is to be left off over the winter be sure to drain it down if there is a possibility of freezing temperatures.

Additional safety features.



Whilst the hot water tap is open, the following safety features apply:

- Temperature selection cannot be transferred.
- If a temperature of 43^0C or higher selected, and the temperature is decreased to below 43^0C, and then raised again the maximum available temperature will be 43^0C.
- Other controllers are unable to change the delivery temperature of the water.

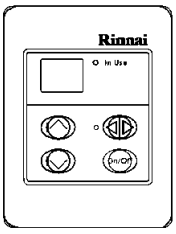
Note

The temperature of the outgoing water is constantly monitored by a built in sensor. If the temperature of the outgoing hot water rises to more than 3ºC above the selected temperature shown on the digital display, or the preset limit if controllers are not fitted, the burner will automatically go out. The red operation indicator will also go out. The burner will ignite again once the outgoing hot water temperature falls to that shown on the digital display (or the pre-set limit of the Rinnai Infinity heater).

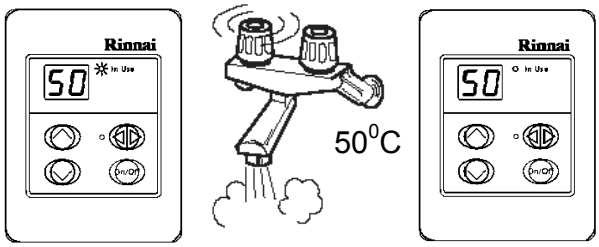
TEMPERATURE CONTROLS - INFORMATION

Do not push the On/Off button on the Master controller after transferring priority of temperature selection to a Secondary controller as the system will shut down.

Do Not Turn OFF the Master Controller



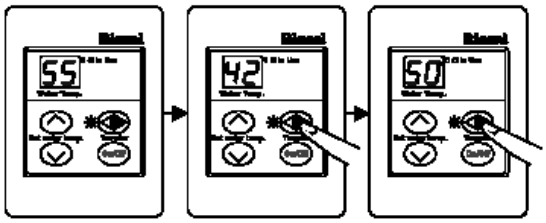
Temperature priority can not be switched to another controller when the water is flowing through the water heater.



Controller 1 in use

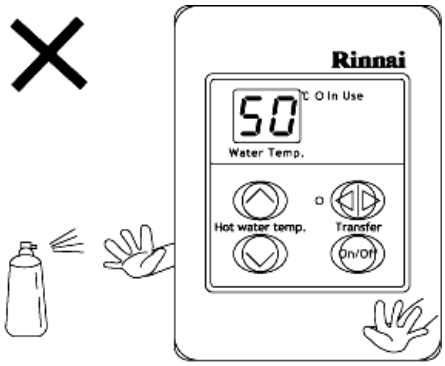
Controller 2 cannot take priority

If a temperature higher than 50ºC has been selected on the **Master** controller and priority of temperature selection is transferred to another controller (or it is turned off), then back again (or turned on again), the temperature on the **Master** controller will automatically drop to 50ºC. If the set point is less than 50°C it will not alter. This is a safety feature.

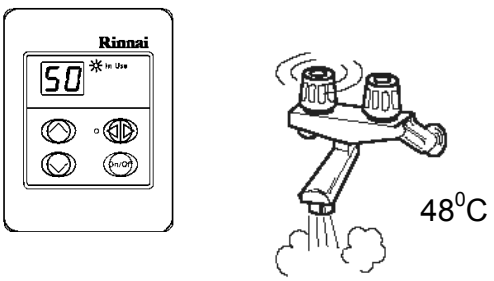


Master Controller | Another Controller | Master Controller

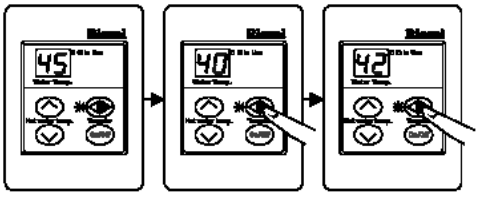
Do not clean the remote control with solvents or detergents. Use only a soft damp cloth.



Depending on the weather conditions and the length of the pipe between the heater and the tap in use, there may be a variation between the temperature displayed at the controller and the temperature at the tap.



If a temperature higher than 42°C has been selected on the **Universal** controller and priority of temperature selection is transferred to another controller (or controller is turned OFF), then back again (or turned ON again), the temperature will automatically drop to 42°C. If the set point is less than 42°C it will not alter. This is a safety feature.



Universal Controller | Another Controller | Universal Controller

TESTING

1. Purge gas, hot water and cold water supply lines before making the final connection of the water heater. Swarf in either the gas or water supplies may cause damage.

2. Turn on gas and cold water supplies.

3. Test for water leaks and gas escapes near the unit.

4. Isolate gas and electric supply. Remove test point screw located on the inlet gas valve connection inside the heater and attach pressure gauge.

5. Turn the power on at the switch and turn on gas. **Warning:** There are 230V AC live supplies inside the heater.

6. If remote controllers are fitted, turn the controller on, select the maximum delivery temperature and open ALL available hot water outlets. If remote controllers are not fitted, simply open all available hot water outlets. (CAUTION: Ensure building occupants do not have access to hot water outlets during this procedure).

7. The gas pressure check must be carried out with all other appliances on the same main operating at maximum capacity to ensure that there is sufficient gas pressure.

8. With all other appliances operating the pressure at the test point on the inlet to the gas valve should read **20 mbar** for Natural Gas. For LPG (Propane) the pressure should be **37 mbar**. If the pressure is lower, the gas supply is inadequate and the water heater will not operate to specification. Check gas meter, regulator and pipework for correct operation/sizing and rectify as required. Note that the gas regulator on the appliance is electronically controlled and factory pre-set. Under normal circumstances it does not need adjustment during installation.

9. Close hot water outlets.

10. Inspect and clean the strainer and the filter located on the cold water inlet pipe. This procedure may need to be repeated to ensure the strainer remains clear.

11. If temperature controllers are fitted, it is necessary to test their operation through the complete range of functions.

12. Confirm the hot water delivery temperature using a thermometer. If controllers are fitted, compare the measured value to the set point.

13. After testing is completed, explain to the user the functions and operation of the water heater and temperature controllers.

GAS PRESSURE SETTING

The working gas pressure on the water heater is electronically controlled and factory set. Under normal circumstances it **does not** require adjustment during installation. Perform this procedure only if the unit is not operating correctly and **all** other possible causes for incorrect operation have been eliminated. **Contact Rinnai UK before attempting to alter the gas pressure. Failure to do so could void the warranty.**

1. Turn 'OFF' the gas supply.
2. Turn 'OFF' 230V power supply.
3. Remove the front cover from the appliance.
4. Check gas type switch no.1 of SW2 (fig. 1) is in the correct position for the type of gas (Nat. or LPG) you are using. (SW2 is top set of switches.)
5. Attach pressure gauge to burner test point. (fig. 2)
6. Turn 'ON' the gas supply.
7. Turn 'ON' 230V power supply.
8. If remote controllers are fitted, turn the unit 'ON' at the master controller, select a maximum delivery temperature and open a hot water tap fully. **(CAUTION: Ensure building occupants do not have access to hot water outlets during this procedure.)**
9. Set the appliance to 'Forced Low' combustion by setting No. 3 dipswitch of the bottom set of dip switches (SW1) to 'ON'. (fig 3)
10. Check the burner test point operating pressure.

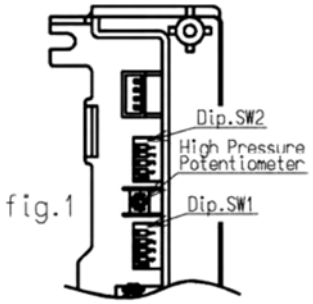
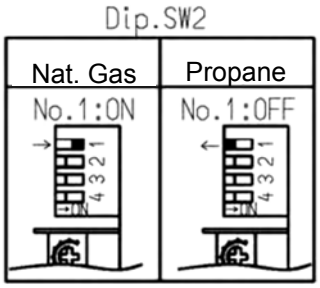


fig.1



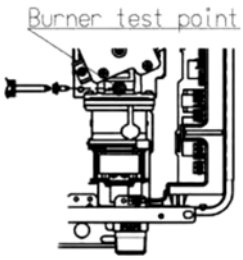


fig.2

fig.3

GAS PRESSURE SETTING

11. Remove rubber access plug and adjust the regulator screw on the modulating valve (fig. 4) as required to the pressure below.

N.G	**1.8 mbar**
Propane	**1.8 mbar**

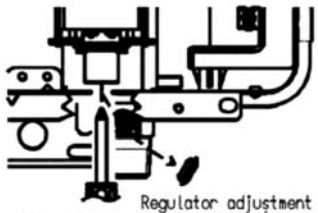


fig. 4

12. Lock the regulating screw on the modulating valve.

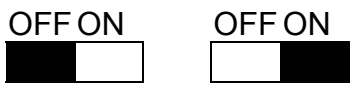
13. Set the appliance to 'Forced High' combustion by setting both no. 3 and no. 4 dipswitches of the bottom set of switches (SW1) to 'ON'. (fig.5) Ensure maximum water flow.

fig.5

14. Check the burner test point pressure.

15. Adjust the high pressure potentiometer on the Printed Circuit Board between SW1 and SW2 to the pressure shown below. The potentiometer is very sensitive, turn no more than a few degrees at a time; then let the pressure settle down before turning it more.

LEGEND:
Black Section indicates position of dip switch.



OFF ON

N.G	**8.8 mbar**
Propane	**8.1 mbar**

16. **IMPORTANT**: Set dip switch no. 3 and no. 4 on the bottom set of switches (SW1) to 'OFF' to return the appliance to 'Normal' combustion. (fig. 6)

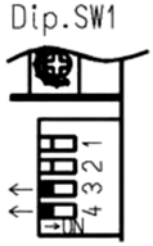


fig.6

17. Close hot water tap.

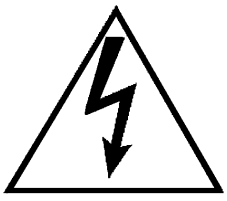
18. Turn OFF the gas supply and 230V power supply.

19. Remove pressure gauge, and replace sealing screw.

20. Turn 'ON' the gas supply and 230V power supply.

21. Operate unit and check for gas leaks at test point.

22. Replace the front cover of the appliance.



CAUTION

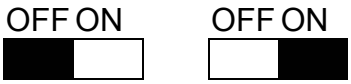
DIP SWITCH SETTING

Dip Switch Positions Explained

OFF ON SW2 (top)

		1	-	Gas Type
		2	-	Temperature
		3	-	Temperature
		4	-	Temperature

LEGEND:
Black Section indicates position of dip switch.



OFF ON

OFF ON SW1 (bottom)

		1	-	Computer Programming
		2	-	Computer Programming
		3	-	Combustion
		4		Combustion

Dip Swiches Explained

GAS TYPE

LPG

OFF ON SW2

■		1	off
		2	
		3	
		4	

NAT GAS

OFF ON SW2

	■	1	on
		2	
		3	
		4	

COMPUTER PROGRAMMING

OFF ON SW1

	■	1	-	Switches are always in these
■		2	-	positions for the Infinity 16e.
		3		
		4		

COMBUSTION

NORMAL

OFF ON SW1

		1	
		2	
■		3	off
■		4	off

FORCED LOW

OFF ON SW1

		1	
		2	
	■	3	on
■		4	off

FORCED HIGH

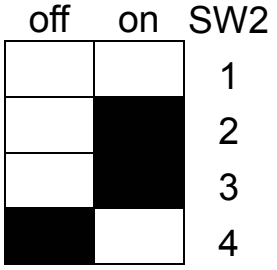
OFF ON SW1

		1	
		2	
	■	3	on
	■	4	on

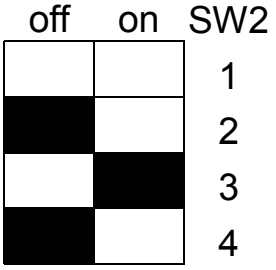
DIP SWITCH SETTING

Infinity 16e

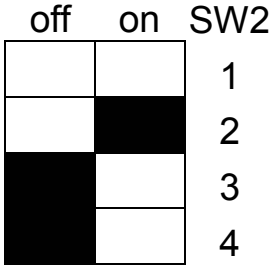
Temperatures - With or Without Remotes



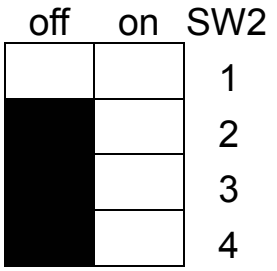
40 deg C



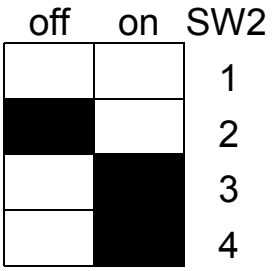
43 deg C



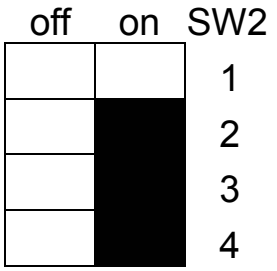
50 deg C



55 deg C



65 deg C



75 deg C

ERROR MESSAGES

Rinnai water heaters have the ability to check their own operation continuously. If a fault occurs, an error code will flash on the Digital Display if you have temperature controllers installed. This assists with diagnosing the fault, and may enable you to overcome a problem without a service call. Please quote the code displayed when enquiring about service. Error codes flash.

Code Displayed	Fault	Remedy
-	Noticeable reduction in water flow	Inlet water filter needs to be cleaned.
10	Not enough combustion air	Check for physical blockages around air intake or exhaust. Check combustion fan.
11	No Ignition / Gas supply	Check gas valves, gas supply and sparker unit.
12	Flame failure / Low Gas flow	Check gas valves and gas supply. Check flame rod. Check exhaust is clear. Check remote control.
14	Remaining flame safety device	Service Call
16	Over temperature warning	Service Call
32	Outgoing water temperature sensor faulty	Service Call
33	Heat Exchanger Thermistor Error	Service Call
52	Gas modulating valve faulty	Service Call
61	Combustion fan failure	Service Call
65	Water Flow Control Device	Service Call
71	Micro-processor failure	Service Call
72	Flame rod circuit error	Service Call

* In all cases, you may be able to clear the Error code by turning the hot water tap OFF, then ON again. If this does not clear the error, try pushing the On/Off button OFF then ON again. If the Error Code still remains contact Rinnai or your nearest service agent for advice.

** Faults caused by insufficient gas/water supply or gas/water quality and installation errors are not covered by the manufacturer's guarantee.

ERROR MESSAGES

Troubleshooting without controllers

If you have not installed temperature controllers and experience the following symptoms, please carry out the suggestions below. If symptoms continue, please contact Rinnai for advice.

Fault	Remedy
Heater does not attempt to start at all.	Check the power is on at the heater. Check the cold water valve supplying the heater is open.
Heater starts then shuts down immediately.	Check the power is on. Check the gas valve at the heater and at the gas meter is fully open. Open the hot water tap fully.
Heater starts then the water goes cold.	Check the power is on. Open your hot water tap further or try another hot outlet.

NOTE: Faults caused by insufficient gas/water supply or gas/water quality and installation errors are not covered by the manufacturer's guarantee.

Installations with circulation pumps

With temperature controller fitted.

If you have an installation using a secondary circulation pump this must be switched off so that there is no flow through the heater when starting or after a power failure. If the pump is running the unit will not operate (no display on the controller). Isolate pump then start heater before restarting pump. This is a safety feature.

The pump should also be fitted with a thermostat to prevent the return temperature reaching the heater set point temperature.

Without temperature controller fitted.

The heater should automatically reset and provide water at the temperature set by the internal limit switches.

RESTARTING THE RINNAI WATER HEATER

Following a power cut the heaters should be restarted in this manner.

Standard system.

Single or multiple water heaters without remote controllers.

The heaters will automatically reset without any user involvement.

Single or multiple water heaters with remote controllers.

The heaters will be required to be switched on using the ON/OFF button on a remote controller. Ensure that all taps/water outlets are closed and no water is flowing through heaters.

Hot water system incorporating secondary recirculation pump.

Single or multiple water heaters without remote controllers.

The heater(s) will automatically reset without any user involvement.

Single or multiple water heater(s) with remote controller(s).

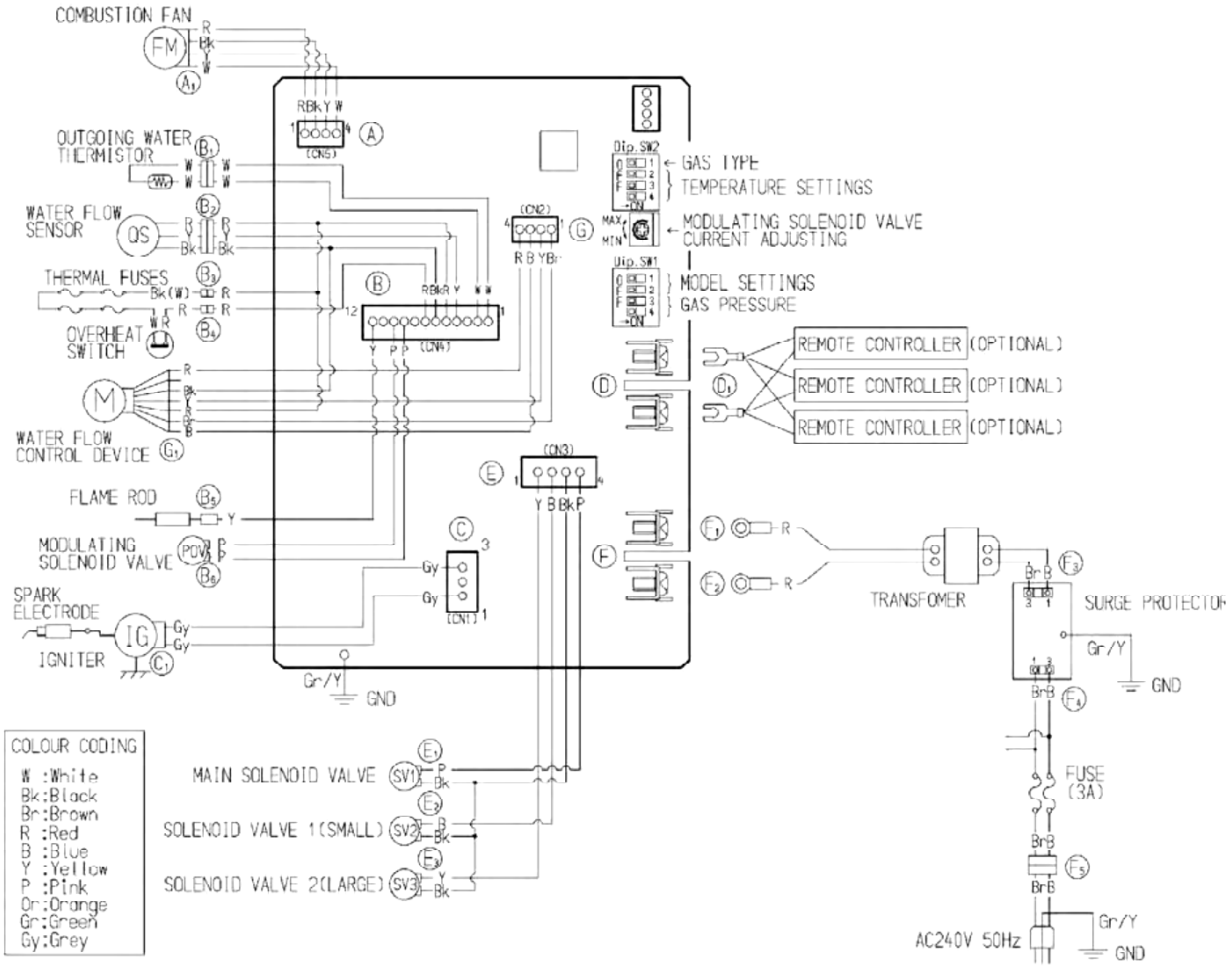
To reset the heaters follow the steps.

1. Turn off all hot water taps.
2. Turn off supply to secondary circulating pump or alternatively, if heater and pump are fed from the same electrical supply, isolate pump flow.
3. Turn on heater at remote control.
4. Select required temperature.
5. Switch on supply to secondary circulating pump or open valve on pump flow.

The heater will now be ready to supply water at the set temperature.

If following the above procedure does not reset the heater switch it on and off at its main supply, and then go through these steps again. If heater is still not working call your local service agent or Rinnai for assistance.

WIRING DIAGRAM



DIAGNOSTIC POINTS

Diagnostic Points- To be read in conjunction with the wiring diagram.

Table reference	Component	Measurement Point		Normal Value	A Note
		CN	Wire Colour		
	Surge Protection		B-Br	AC207~264V	
	Water Flow Control Device	G_1	R(CN2-NO.4)-B	±DC11~13V (Only When Operating)	Operate Electricity
			R(CN4-NO.5)-Bk	DC11~13V	Control Electricity
			Bk-Y	Below DC1V (Limiter On)	Full Open Position
				DC4~6V (Limiter Off)	
			Bk-Br	Below DC1V (Limiter On)	Full Close Position
				DC4~6V (Limiter Off)	
	Remote Control	D	(TERMINAL)	DC11~13V	
3	Water Flow Sensor	B_2	R-Bk	DC11~13V	On 2.4L/min (33Hz) Over 1980 PULSE/min Off 1.7L/min (23Hz) Below 1380 PULSE/min
			Y-Bk GND	DC4~7V (Pulse 20~320Hz)	
8	Combustion Fan	A_1	R-Bk	DC15~46V	
			Y-Bk	DC11~13V	
			W-Bk GND	DC5~10V (33~400Hz)	
	Flame Rod	B_5	Y-FLAME ROD	Over DC1μA	Flame Condition
	Modulating Valve	B_6	P-P	DC2~15V 65~85Ω	
2	Outgoing Thermistor	B_1	W-W	15° C··· 11.4 ~14.0kΩ 30° C··· 6.4 ~ 7.8kΩ 45° C··· 3.6 ~ 4.5kΩ 60° C··· 2.2 ~ 2.7kΩ 100° C··· 0.6 ~ 0.8kΩ	
	Thermal Fuse	B_3 B_4	R-R R-Bk	Below 1Ω	
	Igniter	C_1	Gy-Gy	AC90~110V	
7	Main Solenoid Valve	E_1	P-Bk	DC80~100V 1.7~2.1kΩ	
	Solenoid Valve 1 (Small)	E_2	B-Bk	DC80~100V 1.7~2.1kΩ	
	Solenoid Valve 2 (Large)	E_3	Y-Bk	DC80~100V 1.7~2.1kΩ	
1	Transformer	F	R-R	AC90~110V 11~13kΩ	
		F_1	B-Br	31~36kΩ	
10	Valve Heater	F_5	Y-Y	1kΩ	
	Pipe Heater	F_6	Y-Y	125kΩ~156kΩ	Pipe Heater Only
10	Fan Current	Gas Type	Current	On High	On Ignition
		Prop Nat	660 ± 66mA 585 ± 59mA	297Hz / 4455rpm 279Hz / 4185rpm	180Hz / 2700rpm 180Hz / 2700rpm

SPECIFICATION

Model……..…....……..**Infinity 16e**

Installation……..…….…… **External location only**

Fuel……..…….……...**Natural Gas or LPG ***

Control…….……..……..…..**Modulating**

Input……..…….……....**5.1 to 34.7 kW**

Exhaust type……..……..**Forced Draught Direct Exhaust**

Ignition…….……..…..**Electronic**

Burner……..…….……...**Stainless steel**

Weight……..…….……..…..……**15kg**

Water flow rate ……..…….……...**2.4** to 16L/min**

Minimum operating water pressure……..……..……..……**0.8 Bar**

<u>Connections</u>

Gas……..…….……**3/4BSP**

Water Inlet…….……..……**1/2BSP**

Water outlet……..…….…..**1/2BSP**

Electrical Supply……..……**230V AC 50Hz 1ph**

* Separate models available for Natural gas or LPG fuel.
** Minimum flow rate based on temperature setpoint and inlet conditions.

Rinnai are continually updating and improving products and reserve the right to alter model specifications without prior notice.

SERVICE CONTACT

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WA7 1ST

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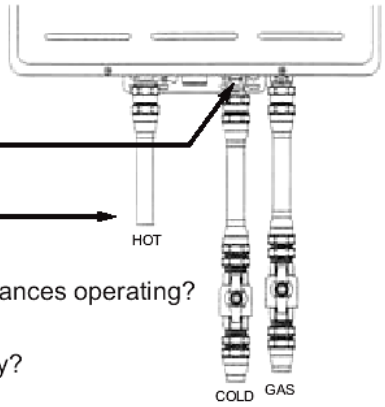
Fax. 01928 531880
E-mail. info@rinnaiuk.com
Web. www.rinnaiuk.com

Attention Installer - have you checked:

- ✓ Gas supply pipe is purged of foreign matter before connection.
- ✓ For Hot and Cold cross connections i.e. Capped breaches/shower mixers, taps closed and reversed 'Flick Mixer' connections?
- ✓ That isolating valves are not connected directly to the appliance and there is means of disconnection after the isolating valve?
- ✓ Have you cleaned cold water inlet filter?
- ✓ That plumbing connections are correct?
- ✓ Is appliance inlet gas pressure correct with all appliances operating?
- ✓ Do the Master Controllers (if fitted) operate correctly?
- ✓ Have you checked water temperature at all outlets?
- ✓ Have you shown the customer how to operate the Temperature Controllers? (If fitted)
- ✓ Have you explained to the customer the minimum flow rate required to operate the unit?
- ✓ Have you explained to the Customer the Benefits of Controllers (If not fitted) and that they can be added later?

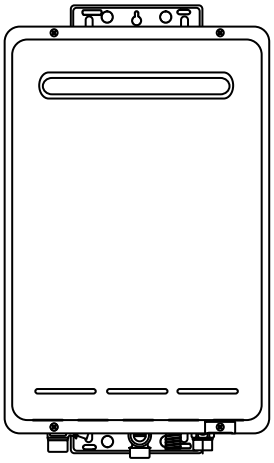


Rinnai

INFINITY 16 e

INFINITY 20 e

SERVICE MANUAL



Rinnai High Capacity Continuous Flow Gas Hot Water System

The Rinnai Infinity 32e and Heavy Duty 70e water heater, when correctly installed, comply with the requirements of the United Kingdom Water Regulations / Byelaws (Scotland). These Products can be found listed in the Water Fittings and Materials Directory.

WRAS APPROVED PRODUCT

CE 0461

The Rinnai Infinity 32e water heater is CE Marked for UK and Ireland as allowed by Technigas of Belgium.
Certificate number E0715/5344
ID number 0461BO0715
Date of Issue 14 July 2003

Quality System Standard

ISO 9001 - 1994

The Design, Development, and Manufacture of Gas Water Heating Appliances done under Rinnai's Quality Management System is certified under the Quality Management System Standard ISO 9001.

Registration Number JQ0003D
Registered since: February 1994
Certified by Japan Gas Appliances Inspection Association.

Produced by Rinnai Technical Services Department

August 2004 - Issue 1.

No portion or part of this manual may be copied without prior permission from Rinnai U.K.
Rinnai U.K. reserves the right to make modifications and change specifications without notice.

WARNING

Failure to comply with these instructions may result in serious personal injury or damage to the appliance.

ALL WIRING INSIDE THIS APPLIANCE MAY BE AT 230 VOLTS POTENTIAL

ALL SERVICE WORK MUST BE CARRIED OUT BY AN AUTHORISED PERSON.

DO NOT TEST FOR GAS ESCAPES WITH AN OPEN FLAME

This manual has been published by Rinnai U.K. Technical Services. While many individuals have contributed to this publication, it will be successful only if you - the reader and customer - find it useful. We would like to extend an invitation to users of this manual to make contact with us, as your feedback and suggestions are valuable resources for us to include as improvements. Rinnai are constantly working toward supply improved appliances as well as information, and specifications may be subject to alteration at any time.

Issue Nº1

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Glossary of Terms and Symbols

dB(A)	-	sound pressure level in decibels, “A” range
DC	-	direct current
AC	-	alternating current
WFCD	-	water flow control device
FB	-	feedback information
FF	-	feedforward information
Hz	-	Hertz
IC	-	integrated circuit
kcal/h	-	kilocalorie per hour
kPa	-	kilopascals
LED	-	light emitting diode
L/min	-	Litres per minute
mA	-	milliamps
MJ/h	-	megajoule per hour
mm	-	millimetres
mmH_2O	-	millimetres of water (gauge pressure)
OHS	-	overheat switch
PCB	-	printed circuit board
CPU	-	central processing unit
POT	-	potentiometer
rpm	-	revolutions per minute
SV	-	solenoid valve
ø	-	diameter
$\Delta\,^{o}C$	-	temperature rise above ambient
POV	-	modulating valve
TE	-	thermal efficiency
TH	-	thermistor
T_{IN}	-	temperature of incoming water
T_{OUT}	-	temperature of outgoing water

1. Introduction

The Rinnai V-Series hot water units represents the latest technology in continuous flow, temperature controlled hot water.

Features

- The Infinity 16e and Infinity 20 NEVER RUNS OUT of hot water. Whilst electricity, water and gas supplies are connected, hot water is available whenever hot water taps are open.

- Built into the main micro-processor is the facility to LIMIT THE MAXIMUM TEMPERATURE of the hot water supplied. The water temperature may be limited to various maximum temperatures. This is particularly useful when the hot water unit is installed where young children or the infirm may be using the hot water. The Infinity is delivered with a maximum preset temperature of 55ºC. If required, the temperature limits can be changed by a service technician. For further information, please contact Rinnai.

- The Infinity is a power flued appliance. It is COMPACT, saving both floor and wall space.

- The temperature of outgoing hot water is CONSTANTLY MONITORED by a BUILT-IN SENSOR. If the temperature of the outgoing hot water rises to more than 3ºC above the selected temperature shown on the Digital Monitor (or the pre-set limit when Remote Controls are not fitted), the burner will automatically go out. The burner will ignite again once the outgoing hot water temperature falls below the temperature shown on the Digital Monitor (or the pre-set limit).

- The burner lights automatically when the hot water tap is opened, and goes out when the tap is closed. IGNITION IS ELECTRONIC, therefore there is not pilot light. When the hot water tap is off, no gas is used.

- 'Standard' Remote Controllers are available as an optional extra. Depending on the models chosen, these offer the following additional features :

  - Localised Temperature Control for up to one kitchen and two bathroom controllers

- Temperatures selected at the controllers are retained in the SYSTEM MEMORY.

- Operating NOISE LEVEL IS VERY LOW.

- ERROR MESSAGES ARE DISPLAYED on the Remote Controllers, assisting with service.

2. Specifications

Type of appliance	Temperature controlled continuous flow gas hot water system
Operation	With / without remote controls, mounted in kitchen, bathroom etc.
Exhaust system	Forced Flue
Rinnai model number	**Infinity 16e**
Installation	Externally mounted
Dimensions	Width — 350mm Height — 530mm Depth — 170mm
Weight	14.5 kilograms
Maximum / Minimum gas consumption	Natural gas : 125～18.8MJ/h (34.7～5.23 kW) Propane gas : 125～18MJ/h (34.7～5.0 kW)
kW Output	27.9 (kW)
Connections	Gas connection — 3/4 in Cold water connection — 1/2 in Hot water connection — 1/2 in
Ignition system	Direct electronic ignition
Electrical consumption	Normal — 47W Standby — 6W (WITH 1 Remote control) Anti-frost protection — 74W
Hot water capacity (Raised 25℃)	2.3 to 16 L/min
Thermal efficiency	80%
NOXaf	35 ppm
Temperature range (with remote)	Kitchen controller : 37～55℃
	Bathroom controller : 37～50℃
Default temperature control (without remote)	40℃、43℃、50℃、55℃(factory setting)、65℃、75℃ (Set by combination of Dip switches on PCB)
Water Temperature control	Simulation feedforward and feedback
Water flow control	Water flow sensor, Electronic water flow control device.
Minimum operating water pressure	1.0bar
Nominal operating water pressure	1.00bar～8.30bar
Minimum operating water flow	2.7 L/min
Maximum operating water flow	16 L/min
Power supply	Appliance — AC 240 Volts 50Hz Remote Control — DC 12 Volts (Digital)
Safety device	Flame failure — Flame rod
	Boil dry — Water flow sensor
	Remaining flame (OHS) — 97℃ bi-metal switch
	Over temperature — 95℃ lockout thermistor
	Fusible link — 129℃ Thermal Fuse
	Pressure relief valve — Opens 20.6bar, closes 14.7bar
	Combustion fan rpm check — Integrated circuit system
	Over current — Glass fuse (3 Amp.)
Remote control (optional)	Kitchen control —MC-91-1A
	Bathroom control —MC-91-1A
	Second bathroom control —MC-91-1A
Cable (optional)	Non-polarized two core cable

Note 1: The default factory setting is 55º C for 16e. The unit can be ordered from Rinnai to be pre-set to any of the other temperatures listed. The unit can be pre-set to any of the temperatures listed by a suitably qualified person.
Controllers are available with default temperatures up to 75º C. When fitted with controllers, only temperatures not exceeding the default temperatures can be selected. When fitted without controllers, the unit will deliver water at the default temperature.

Infinity 20e

Type of appliance	Temperature controlled continuous flow gas hot water system
Operation	With / without remote controls, mounted in kitchen, bathroom etc.
Exhaust system	Forced Flue
Rinnai model number	**Infinity 20e**
Installation	Externally mounted
Dimensions	Width — 350mm Height — 530mm Depth — 170mm
Weight	15.5 kilograms
Maximum / Minimum gas consumption	Natural gas : 160～20MJ/h (44.4～5.58kW) Propane gas : 160～21.3MJ/h (44.4～5.93kW)
kW Output	36.3 (kW)
Connections	Gas connection — R3/4 in Cold water connection — R1/2 in Hot water connection — R1/2 in
Ignition system	Direct electronic ignition
Electrical consumption	Normal — 55W standby — 6W (WITH 1 Remote control) Anti-frost protection — 74W
Hot water capacity (Raised 25℃)	2.5 to 20 L/min
Thermal efficiency	80%
NOXaf	37 ppm
Temperature range (with remote)	Kitchen controller : 37～55℃
	Bathroom controller : 37～50℃
Default temperature control (without remote)	40℃、43℃、50℃、55℃(factory setting)、65℃、75℃ (Set by combination of Dip switches on PCB)
Water Temperature control	Simulation feedforward and feedback
Water flow control	Water flow sensor, Electronic water flow control device.
Minimum operating water pressure	1.0bar
Nominal operating water pressure	1.5 bar ～ 8.3 bar
Minimum operating water flow	2.7 L/min
Maximum operating water flow	20 L/min
Power supply	Appliance — AC 240 Volts 50Hz Remote control — DC 12 Volts (Digital)
Safety device	Flame failure — Flame rod
	Boil dry — Water flow sensor
	Remaining flame (OHS) — 97℃ bi-metal switch
	Over temperature — 95℃ lockout thermistor
	Fusible link — 129℃ Thermal Fuse
	Pressure relief valve — Opens 20.6bar, closes 14.7bar
	Combustion fan rpm check — Integrated circuit system
	Over current — Glass fuse (3 Amp.)
Remote control (optional)	Kitchen control —MC-91-1A
	Bathroom control —MC-91-1A
	Second bathroom control —MC-91-1A
Cable (optional)	Non-polarized two core cable

Note 1: The default factory setting is 55° C for Infinity 20e. The unit can be ordered from Rinnai to be pre-set to any of the other temperatures listed. The unit can be pre-set to any of the temperatures listed by a suitably qualified person.
Controllers are available with default temperatures up to 75º C. When fitted with controllers, only temperatures not exceeding the default temperatures can be selected. When fitted without controllers, the unit will deliver water at the default temperature.

Sensors and Safety Devices

- Heat Exchanger Thermistor: Measures hot water temperature at heat exchanger outlet. If water temperature reaches a predetermined limit, gas supply is stopped.
- Hot Water Delivery Thermistor: Measures hot water temperature at the outlet valve (i.e. the 'mixed' temperature).
- Flame Rod: Monitors combustion characteristics inside the combustion chamber. If the flame fails, gas supply is stopped.
- Overheat Switch: Situated on the heat exchanger, gas supply is stopped when water temperature reaches 97° C for a number of seconds.
- Fusible Link: Situated on the heat exchanger, electrical power supply is stopped if the temperature exceeds 129° C.
- Water Pressure Relief Valve: Safeguards the water circuit against excessive inlet pressure. Opens at 20.6 bar, closes at 14.7 bar.
- Electrical Fuse: (3A glass fuse) prevents against over-current.
  Surge Protector: prevents against over-current.
- Boil Dry Prevention: If water flow sensor detects no flow, gas supply is stopped.
- Combustion Fan Speed Sensor: In case of combustion fan defect (no rotation of fan) gas supply is stopped.
- Temperature Cutout: If the delivered hot water temperature rises above the required delivery temperature for a number of seconds, the gas supply is stopped.

Combustion Specifications - 16e

Gas Type	Injector Size (mm) Upper / [Lower]	Nominal TPP (kPa) **		Gas Input (MJ/hr)	
		Low	High	Low	High
Natural	ø 0.85 [ø 1.30]	0.181 2.05	0.883 1.13	18.8	125
Propane	ø 0.7 [ø 1.05]	0.178 2.75	0.814 2.75	18	125

Combustion Specifications - 20e

Gas Type	Injector Size (mm) Upper / [Lower]	Nominal TPP (kPa) **		Gas Input (MJ/hr)	
		Low	High	Low	High
Natural	ø 0.85 [ø 1.3]	0.181 2.05	0.922 1.13	20	160
Propane	ø 0.7 [ø 1.05]	0.187 2.75	0.827 2.75	21	160

** The TPP is measured with the cover off the appliance at the regulator test point with supply pressures of 20 mbar (NG) and 37 mbar (Propane).

3. Water Flow Rates and Pressures

Water Flows

Table 1 shows unmixed and mixed water flow rates and approximate gas consumptions for various temperature rises. The unmixed flow rates are the flow rates available at the given temperature rise directly at the outlet of the water heater. The mixed water flow rates are available at the given temperature rise by mixing hot water from the outlet of the water heater with cold water from the mains supply.

Water Flows can also be calculated by the following formula :

Q = Heat energy available in kW = 28 kW for the 16e
C = Specific heat of water = 4.2KJ/Kg ° C. C does not change for the purpose of this calculation.
Δ T = Temperature rise required (° C)

Example:
What is the flow rate available with an incoming water temperature of 10° C and a required temperature of 20° C?

Δ T = 20 - 10 = 10° C
Q = 28
C = 4.2

M = 60 x (28 / (4.2 x 10)) = 40 l/min. Since 40 is greater than 16 this flow rate is mixed. This result corresponds with the value in Table 1.

20e

Q = Heat energy available in kW = 36 kW for the 20e
C = Specific heat of water = 4.2 KJ/Kg ° C. C does not change for the purpose of this calculation.
Δ T = Temperature rise required (° C)

Example:
What is the flow rate available with an incoming water temperature of 10° C and a required temperature of 20° C?

Δ T = 20 - 10 = 10° C
Q = 28
C = 4.2

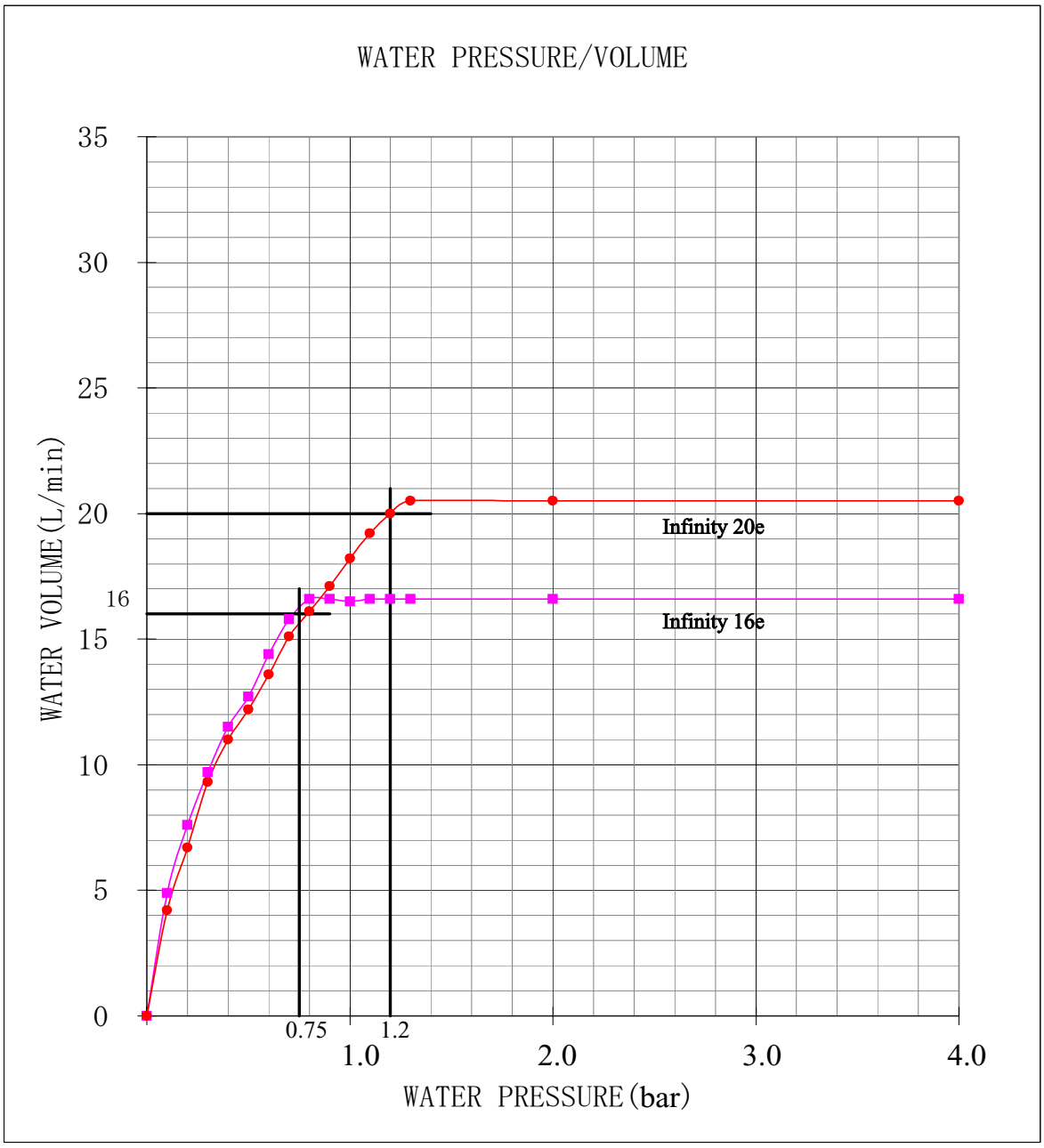
M = 60 x (28 / (4.2 x 10)) = 40 l/min. Since 40 is greater than 20 this flow rate is mixed. This result corresponds with the value in Table 1.

Table 1: Approximate Water Flows & Gas Usage - 16e / 20e

Models (All Pre-set Temperatures)	Temp Rise (° C)	5					10					15					20				
	Approx. Min / Max Gas Input (MJ/hour)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)
REU-V16eW - Ext.	18-125 20-125	0.27	16	960	72	25	0.27	16	960	72	50	0.27	16	960	72	75	0.27	16	960	72	100
REU-V2020W - Ext.	21-160	0.33	20	1200	115	31	0.33	20	1200	115	62	0.33	20	1200	115	93	0.33	20	1200	115	124
Models (All Pre-set Temperatures)	Temp Rise (° C)	25					30					35					40				
	Approx. Min / Max Gas Input (MJ/hour)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)
REU-V1616W	18-125 20-125	0.27	16	960	72	125	0.22	13.2	792	60	125	0.19	11.4	684	44	125	0.17	10.2	612	35	125
REU-V2020W	21-160	0.33	20	1200	115	155	0.29	17.4	1044	87	160	0.25	15	900	64	160	0.22	13.2	792	50	160
Models (All Pre-set Temperatures)	Temp Rise (° C)	45					50					55					60				
	Approx. Min / Max Gas Input (MJ/hour)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)	L/sec	L/min	L/hr	Min Water Pressure (kPa)	Approx Gas Cons. (MJ/h)
REU-V1616W	18-125 20-125	0.15	9	540	29	125	0.13	8	480	24	125	0.12	7.2	434	21	125	0.11	6.6	396	20	125
REU-V2020W	21-160	0.19	11.4	684	42	160	0.17	10.2	612	35	160	0.16	9.6	576	29	160	0.14	8.4	504	26	160

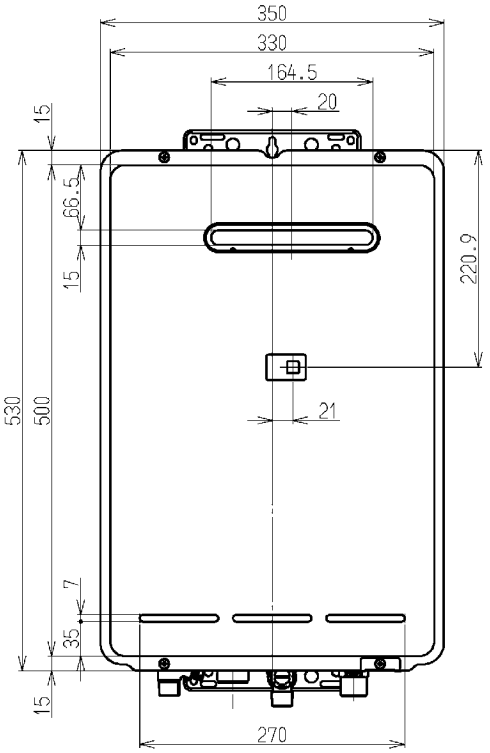
Water Pressure

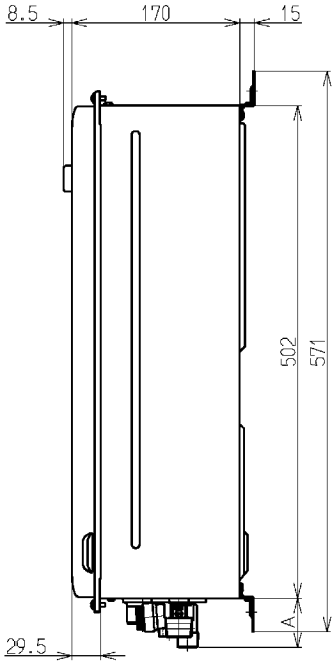
As seen in the table below a minimum supply pressure of .80 bar is required to operate at the rated flow of 16 L/min. In an actual installation, pressure losses in the plumbing system also need to be considered.

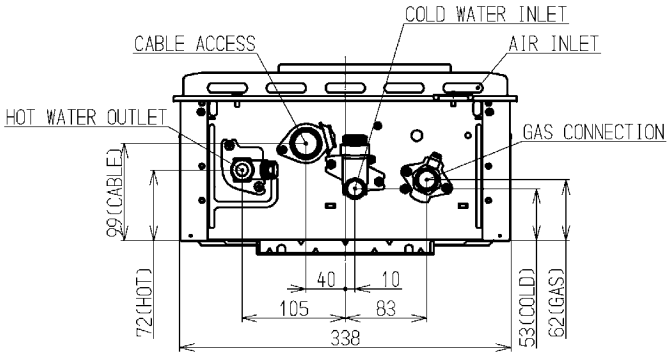


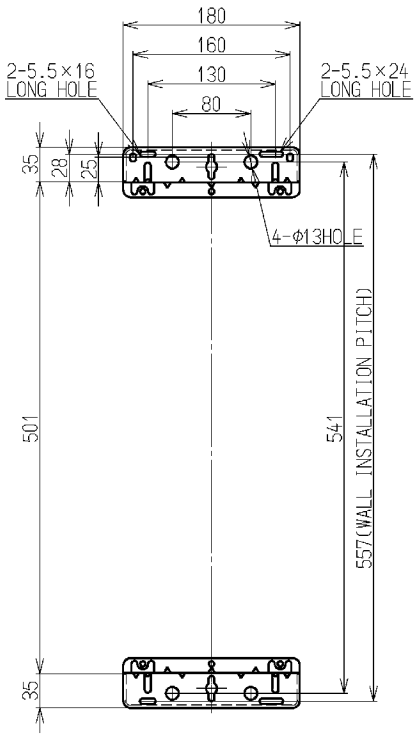
4. Dimensions

16e





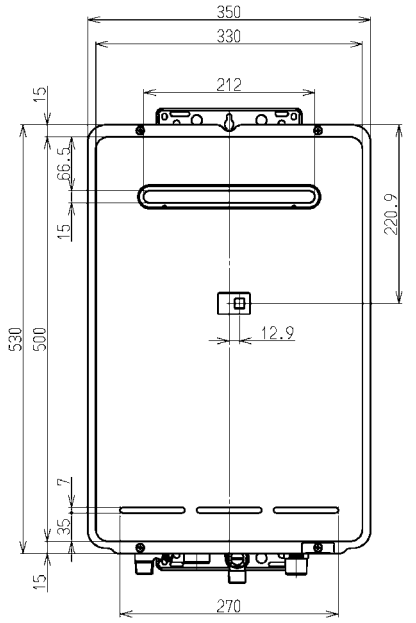


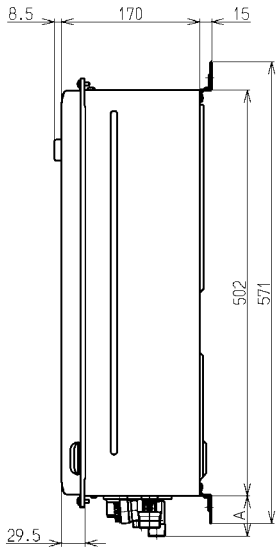


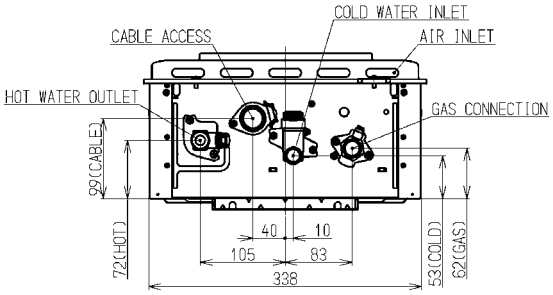
(mm)

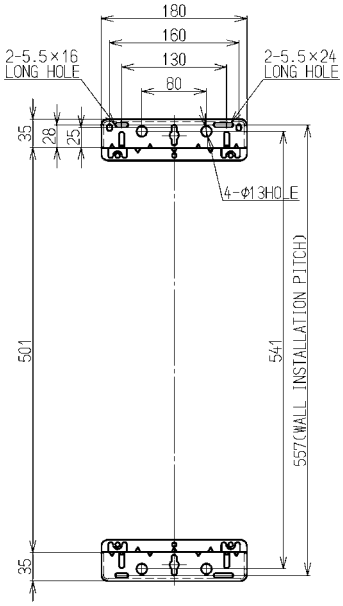
	A DIMENSION
GAS	40
COLD	50
HOT	39
CABLE ACCESS	26

20e









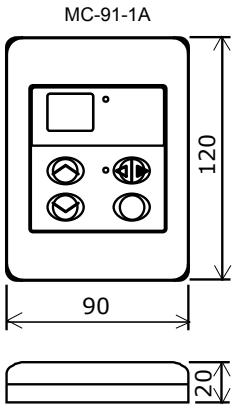
(mm)

	A DIMENSION
GAS	40
COLD	50
HOT	39
CABLE ACCESS	26

5. Remote Controls

Remote Controls

Remote Controllers are an optional extra. 'Standard' controllers can be fitted. Standard controllers allow temperature selection only. For detailed information regarding controller operation refer to the 'How to use your water heater' booklet supplied with the appliance. Other manufacturers' controllers are NOT compatible with this appliance.



Standard Controller (Model MC-91)

Up to 3 Standard Controllers can be fitted to the appliance. They are normally installed in the areas where the majority of hot water is used, for example, the kitchen, bathroom, ensuite and laundry.

Positioning of Controllers

Controllers must be installed in shaded and clean locations. They should be fitted out of reach of children (suggested height from floor at least 1500mm). Controllers are water resistant, however, durability is improved when positioned outside the shower recess or at least 400mm above the highest part of a sink, basin or bath.

DO NOT INSTALL THE CONTROLLERS

- NEAR A HEAT SOURCE, SUCH AS A COOK TOP, STOVE OR OVEN. HEAT, STEAM, SMOKE AND HOT OIL MAY CAUSE DAMAGE
- IN DIRECT SUNLIGHT
- OUTDOORS UNLESS AN ENCLOSURE IS PROVIDED WHICH PROTECTS THE CONTROLLER AGAINST SUNLIGHT AND DUST INGRESS.
- AGAINST A METAL WALL UNLESS THE WALL IS EARTHED IN ACCORDANCE WITH LOCAL REGULATIONS.

Remote Controller Connection

Remote controls operate at extra low voltage (12 Volts DC) which is supplied from the appliance. Controllers are supplied with 15 m of electrical cable. The cable wires for connection to the appliance are fitted with spade terminals.

Extension cables are available from Rinnai. Alternatively, a two core sheathed (double insulated) flex with minimum cross-sectional area of 0.5 mm² can be used. Maximum cable length is 50 m.

For connection refer to the “CONNECTING REMOTE CONTROL CABLES” section.

If the front cover of the appliance contains the following text install it in accordance with Diagram 1 below:

Water Heater and Controller installation configurations

"THIS APPLIANCE DELIVERS WATER NOT EXCEEDING 50ºC"

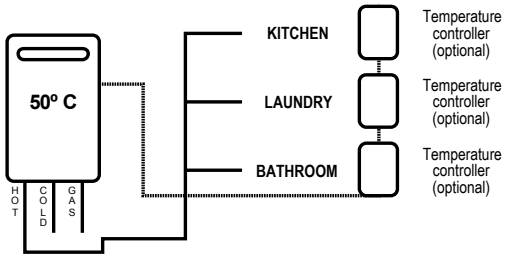


Diagram 1. 50º C Appliance

If the front cover of the appliance does NOT contain the above text install it in accordance with Diagram 2:

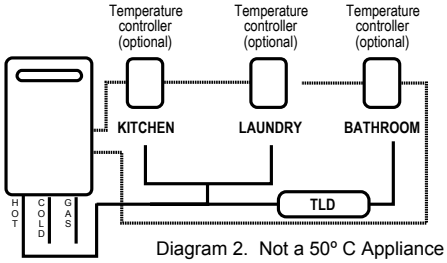


Diagram 2. Not a 50º C Appliance
Note: TLD = Temperature Limiting Device.

IMPORTANT: If the appliance is to deliver water primarily for the purposes of personal hygiene in an early childhood centre, primary or secondary school, nursing home or similar facility for young, aged, sick or disabled persons a Temperature Limiting Device (TLD), such as a Tempering Valve, may be required even if the appliance is set to 50º C or less. For these types of applications contact Rinnai UK.

Connecting remote control cables

Do not attempt to connect the remote control cable terminals to the appliance with the power on.
RISK OF ELECTRICAL SHOCK.

Connecting One or Two Controllers

1. Isolate the power supply
2. Remove the front cover from the Appliance (4 screws) fig. 1.
3. Thread the cable(s) through the cable access hole at the base of the appliance.
4. Connect the spade connectors to the terminals marked "Remote Control" on the printed circuit board (fig. 2). Polarity is not important. Either wire colour can be connected to either terminal.
5. Replace cover of the Appliance. Ensure that the screw with the star washer is placed at the bottom right hand corner for earthing purposes.

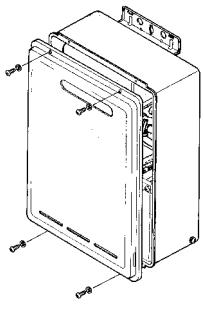
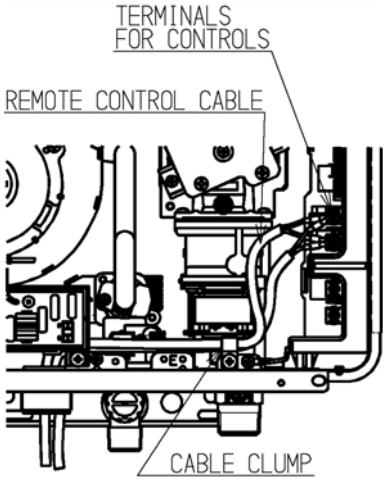


fig.1.

Connecting Three Controllers



6. Isolate the power supply
7. Remove the front cover from the Appliance (4 screws) fig.1.
8. Cut the spade connectors from 2 of the controller cables to be connected to the appliance (4 spade connectors should be cut off) and discard. Connect the wires from these two cables and terminate into two new spade connectors as shown in fig.3. Spade connectors are available from your local electrical component retailer.
9. Thread the 3 cables through the cable access hole at the base of the appliance. Connect the 4 spade connectors to the terminals marked "Remote Control" on the printed circuit board (fig.2). Polarity is not important. Either wire colour can be connected to either terminal.
10. Replace cover of the Appliance. Ensure that the screw with the star washer is placed at the bottom right hand corner for earthing purposes.
    For the Controller in the 'KITCHEN' only, press and hold the 'Transfer' and 'On/Off' buttons simultaneously (see fig. 1) until a 'beep' is heard (approximately 5 seconds).

Question 2: Is your water heater labelled "THIS APPLIANCE DELIVERS WATER NOT EXCEEDING 50° C " On the front cover ?

IF YES: No further action required.

IF NO: You will need to program the Kitchen controller to enable selection of temperatures higher than 50º C.

STEP 1:

For the controller in the KITCHEN only, press and hold the 'Transfer' and 'On/Off' buttons simultaneously (see fig 1.) until a 'beep' is heard (approximately 5 seconds).

STEP 2:

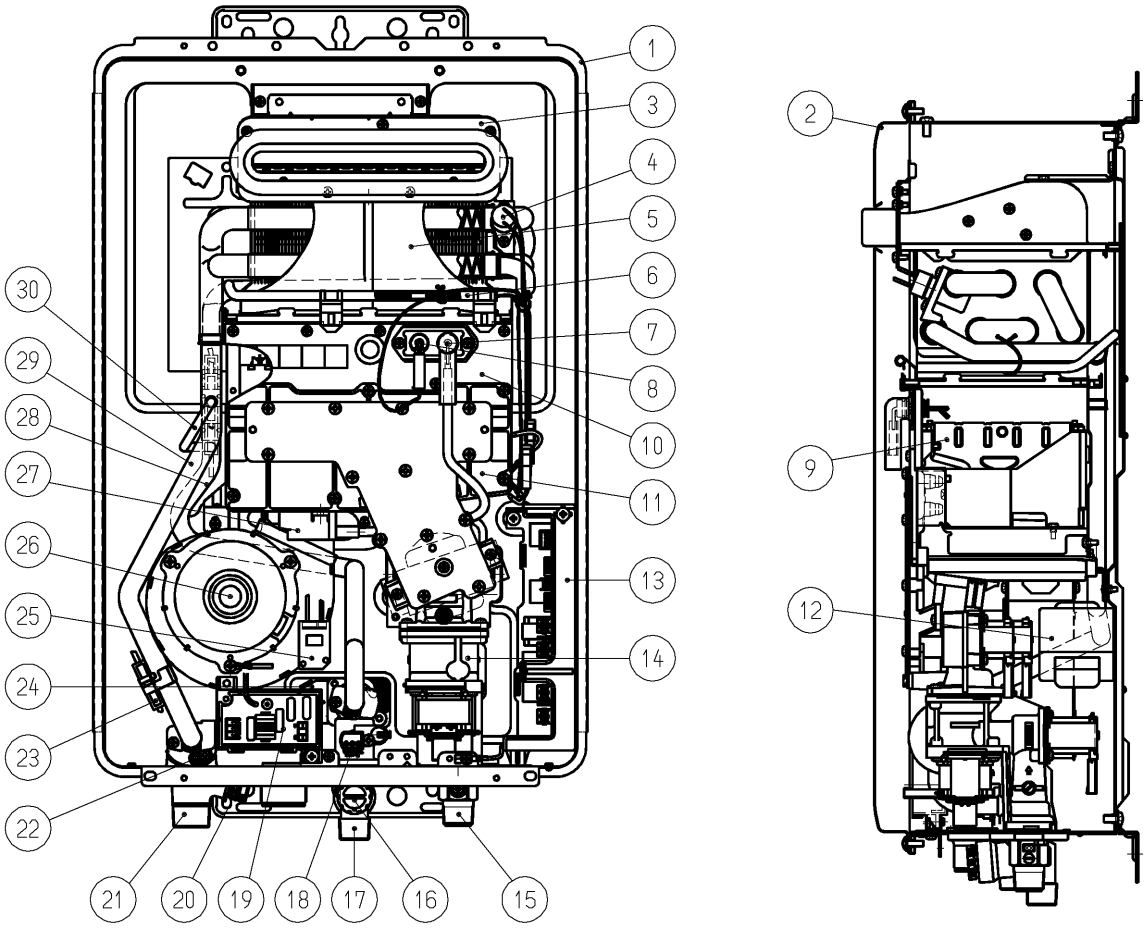
When the controller fitted in the KITCHEN is switched on, it should be possible to select temperatures higher than 50º C. If not, repeat Step 1.

Note:

- If the kitchen controller is replaced, repeat STEP 1 above for the replacement controller
- If the kitchen controller is swapped with another controller (for example, the controller fitted in a bathroom), repeat STEP 1 for the controller moved from the kitchen to the bathroom. Then perform STEP 1 for the controller moved from the bathroom to the kitchen.

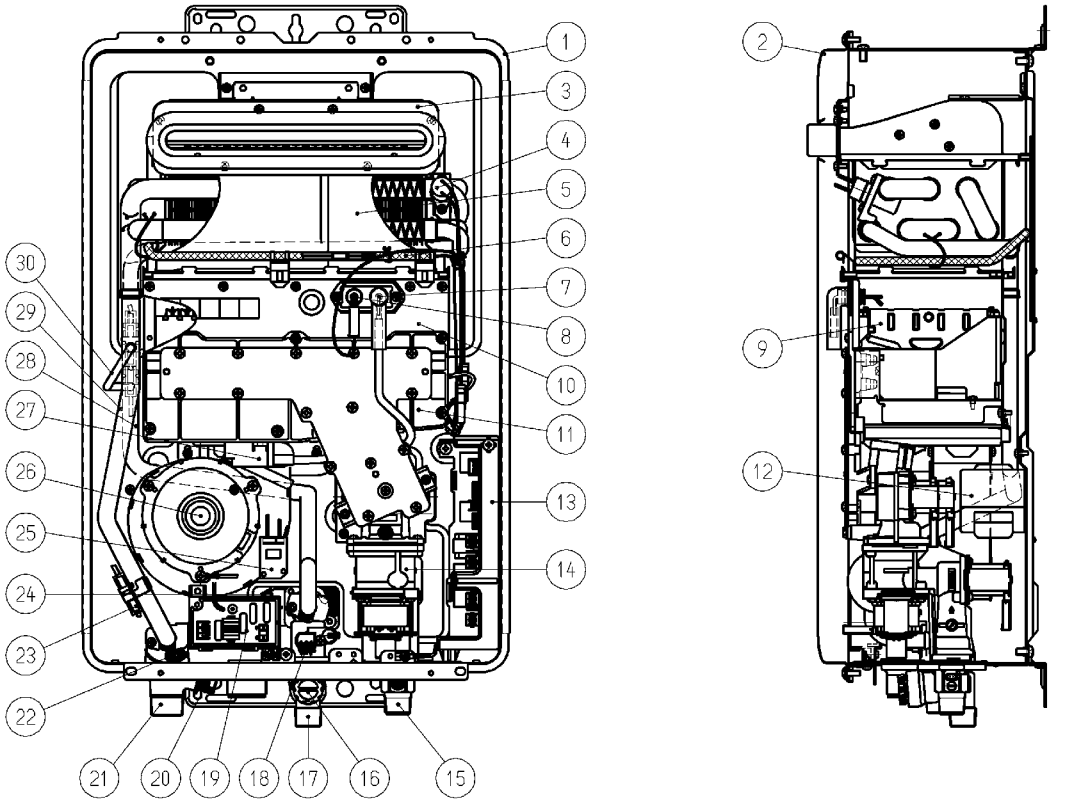
6. Cutaway Diagram

16e



Part No.	Description	Part No.	Description	Part No.	Description
1	Casing Assembly	11	Manifold Assembly	21	Hot Water Outlet
2	Front Panel Assembly	12	Transformer	22	Ongoing Water Thermistor
3	Flue Outlet	13	P.C.B.	23	Anti-Frost Heater
4	Overheat Switch	14	Gas Control Assembly	24	Water Flow Control Device
5	Heat Exchanger	15	Gas Connection	25	Frost Sensing Switch
6	Thermal Fuses	16	Water Filter Assembly	26	Combustion Fan
7	Electrode	17	Water Inlet	27	Igniter
8	Flame Rod	18	Water Flow Sensor	28	Water Connecting Pipe
9	Main Burner	19	Surge Protector	29	Hot Water Connecting Pipe
10	Combustion Chamber Front Plate Assembly	20	Pressure Relief Valve	30	By-pass Pipe

20e



Part No.	Description	Part No.	Description	Part No.	Description
1	Casing Assembly	11	Manifold Assembly	21	Hot Water Outlet
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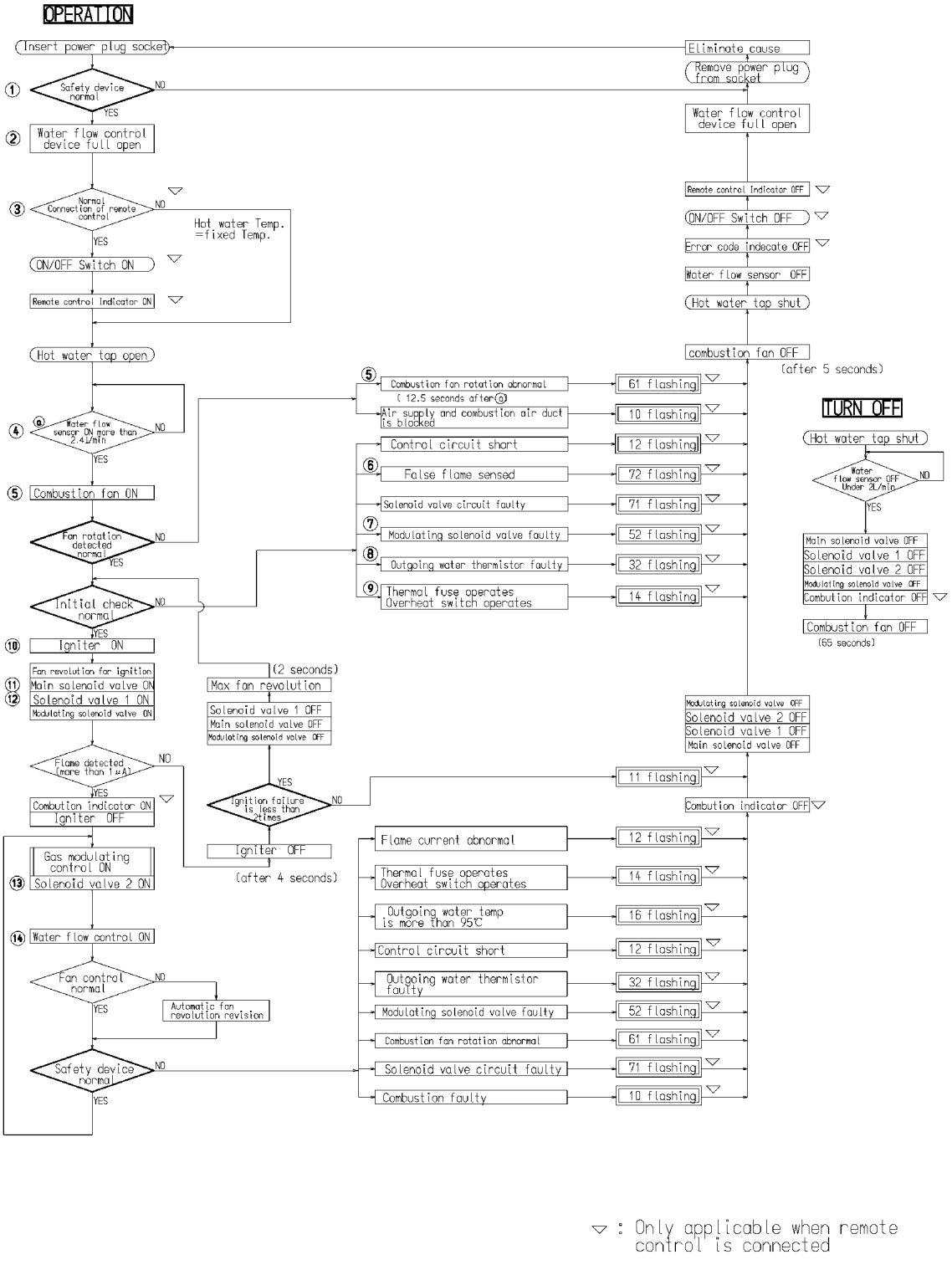
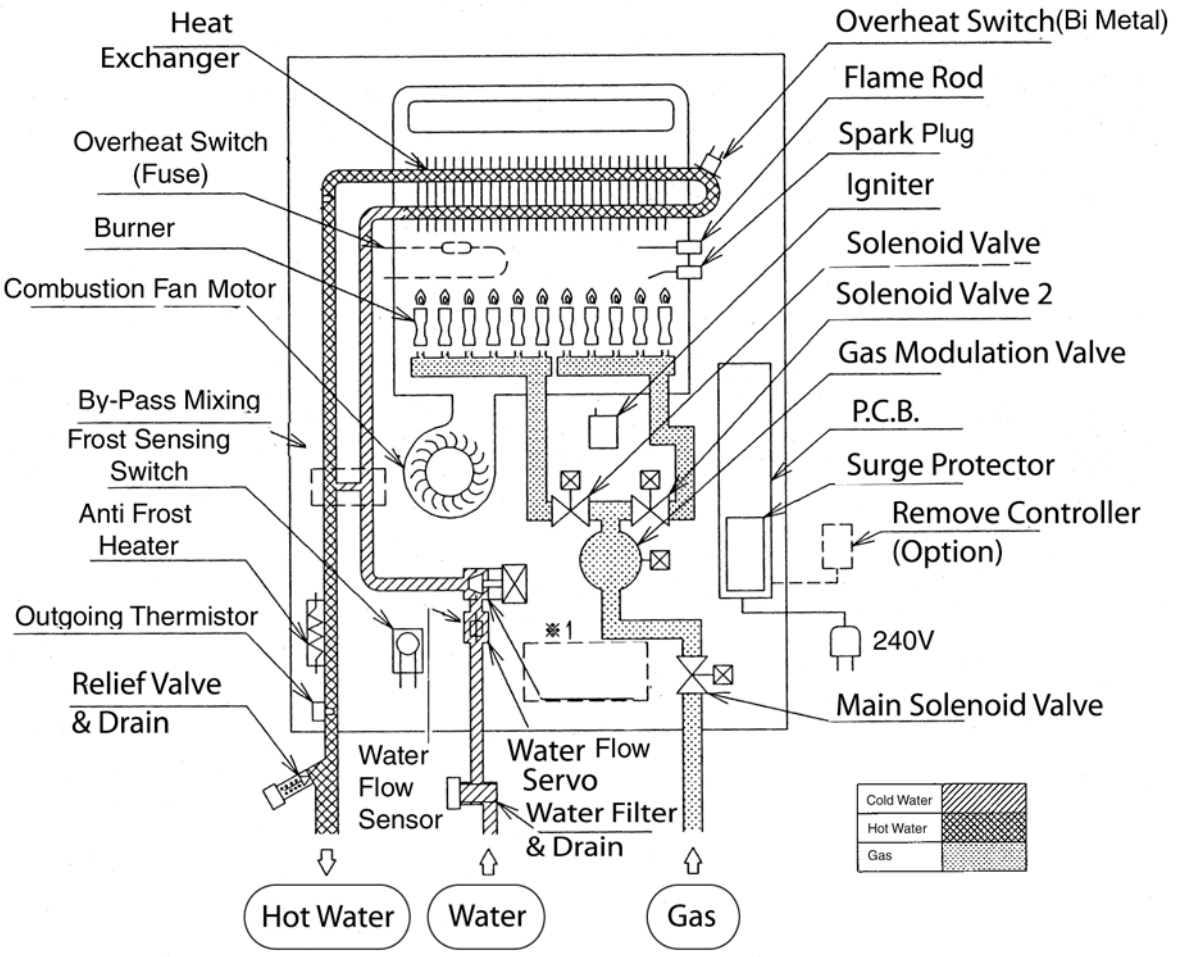
10	Combustion Chamber Front Plate Assembly	20	Pressure Relief Valve	30	By-pass Pipe

7. Operational Flow Chart



8. Operation Principles



Hot Water Operation

1. Ignition

- Activate controllers (if fitted) and open the hot water tap (for full details regarding operation of controllers refer to the 'How To Use Your Water Heater' booklet).
- When water flows through the unit, the water flow sensor rotates and sends an electrical 'pulse' signal to the Printed Circuit Board (PCB). This signal is proportional to the water flow rate.
- The PCB sends electrical current to the combustion fan motor causing it to turn. The fan motor sends an electrical pulse signal to the PCB. If fan rotation is OK, the main solenoid and changeover solenoid valves open as required, the spark generator activates and the spark electrode ignites the burner.

2. Water Temperature / Flow Control / Volume Control

- The PCB will automatically control operation of the internal components to achieve the programmed temperature. When a high temperature rise is required, the PCB may cause the Water Flow Servo to close partially resulting in a lower flow rate to achieve the programmed temperature. This is a necessary operational feature of the unit.
- When operating in 'Bath Fill' mode, the signal from the water flow sensor is also used by the PCB to compute the volume of water that has been passed through the unit at any instant whilst the bath is filling.

3. Shut Down

- When operating in 'Bath Fill' mode, the PCB causes the Water Flow Servo to close when the programmed Bath Fill volume has passed through the unit. Alternatively, flow is stopped when the user closes the hot water tap.
- When water flow stops, the water flow sensor stops rotating and the pulse signal to the PCB stops. The PCB then causes the main solenoid and solenoid valves to close and the burner is extinguished. The combustion fan will continue to operate for some time to purge the combustion chamber.

9. Main Components

1) Printed Circuit Board

- The Printed Circuit Board controls all operational functions including Air Supply Control, Gas Control, Water Flow Measurement, Water Flow Control, Combustion System and all sensors and safety devices.

2) Gas Flow Control

- During normal operation, the PCB keeps the main solenoid valve open whilst there is flow through the unit and the burner needs to be lit.
- Gas flow rate is controlled by the modulating valve assembly and three changeover solenoid valves to always ensure constant outlet water temperature, regardless of flow rate or incoming water temperature.
- The modulating valve is electronically controlled by the PCB using signals from the water flow sensor, water flow control device, water temperature thermistors and combustion fan speed sensor. The modulating valve directs gas to the three changeover solenoid valves.
- The three changeover solenoid valves direct gas to each of the two burner banks independantly. Any one or two or both of the solenoid valves may be open during operation.
- Gas flow is modulated between 18 and 125 MJ/hr for REU-V1616W and between 20 and 160 MJ/hr for REU-V2018W and REU-V2020W by a combination of the modulating valve and changeover solenoid positions.
- The maximum gas rate is predetermined and the appliance cannot be overloaded when correctly installed.

3) Water Flow Control

- Water flow is detected by a turbine coupled to a magnetic pulse generating device. The magnetic pulses are detected and counted by the PCB. The PCB calculates the exact water flow from the frequency of pulses generated by the turbine. A minimum flow rate of 2.4 L/min. is required for the burner to ignite.
- Water flow control is achieved through the use of servo driven water flow and fixed bypass. Servo motor is controlled by the PCB. The 'Water Flow Valve' restricts the flow of water into the heat exchanger assembly if the programmed temperature cannot be achieved. During normal operation, cold water from the inlet valve is mixed with hot water from the heat exchanger outlet.
- The 'Bypass' mixes cold and hot water to ensure hot water delivery temperature over the available range of flow rates.

4) Air Supply Control

- Air for combustion is supplied by a centrifugal fan driven by a variable speed DC motor. The voltage to the motor is determined by the PCB based on water flow, delivered water temperature and programmed water temperature. The actual fan speed is monitored by a magnetic pulse counter. This counter emits a signal to the PCB. From the voltage supplied to the DC motor and the fan speed signal, the PCB determines whether an error condition exists with the fan.

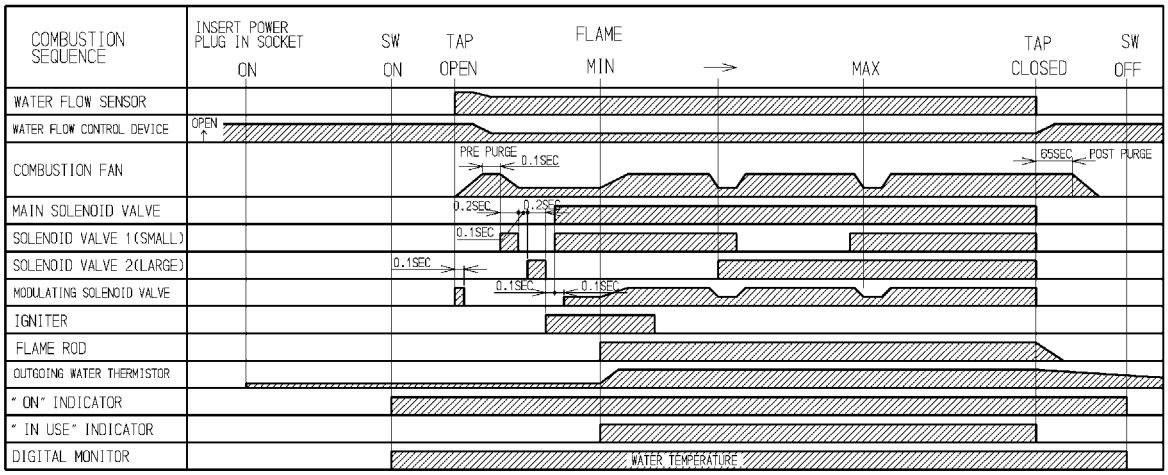
5) Combustion System

The combustion chamber is housed within the heat exchanger assembly and comprises:

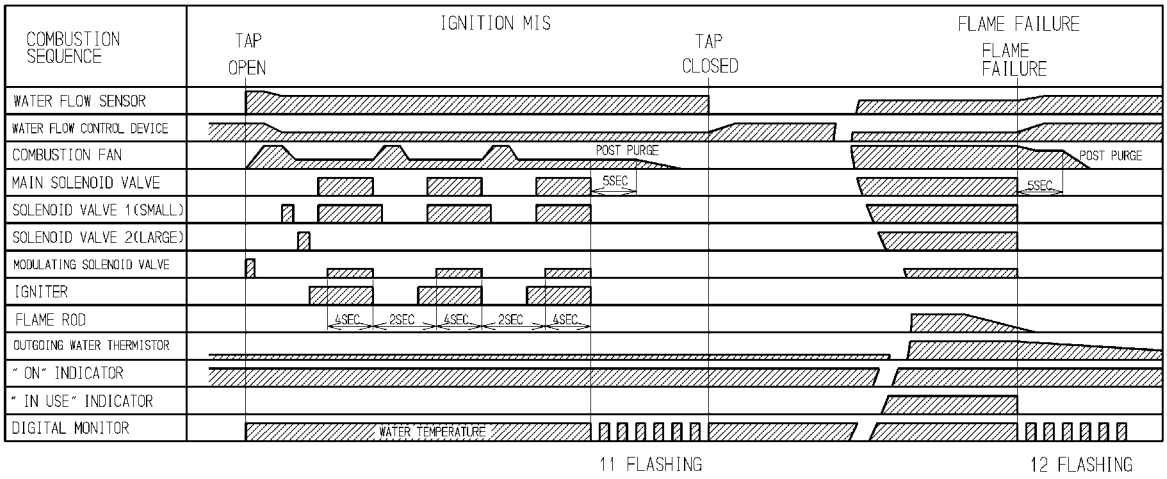
- Aluminium alloy manifold with a total of 28 integral injectors. Gas flow to each chamber is controlled by an electronic solenoid valve (refer 'Gas Flow Control' above).
- A burner assembly comprising fourteen identical modular stainless steel bunsen burners secured by an aluminised steel framework. The manifold is attached to the front of the burner module. Each bunsen burner is supplied by two injectors.
- A combustion chamber. Integrated into the combustion chamber front panel are the flame rod and two ignition electrodes.

10. Time Charts

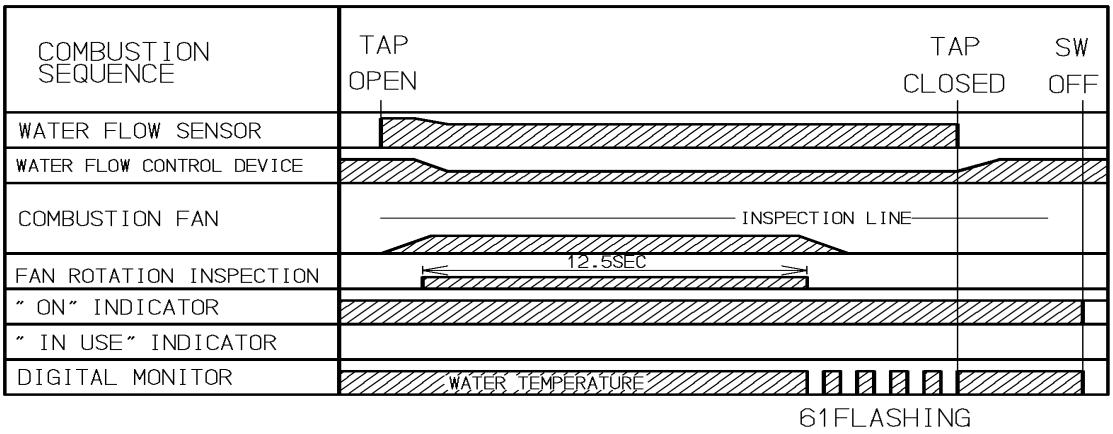
Normal Combustion



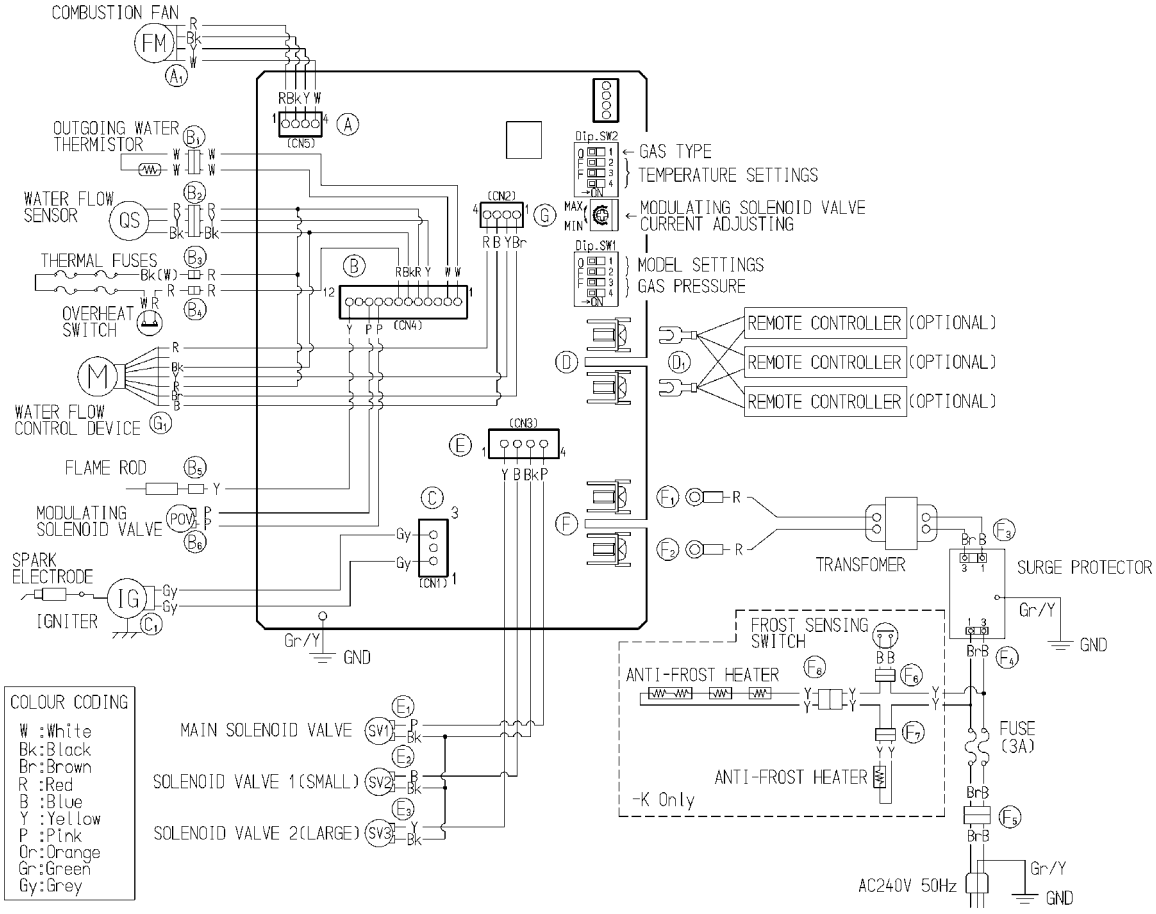
Mis-Ignition / Flame Failure



Abnormal Pre-Purge (Air Supply/Exhaust Blockage)

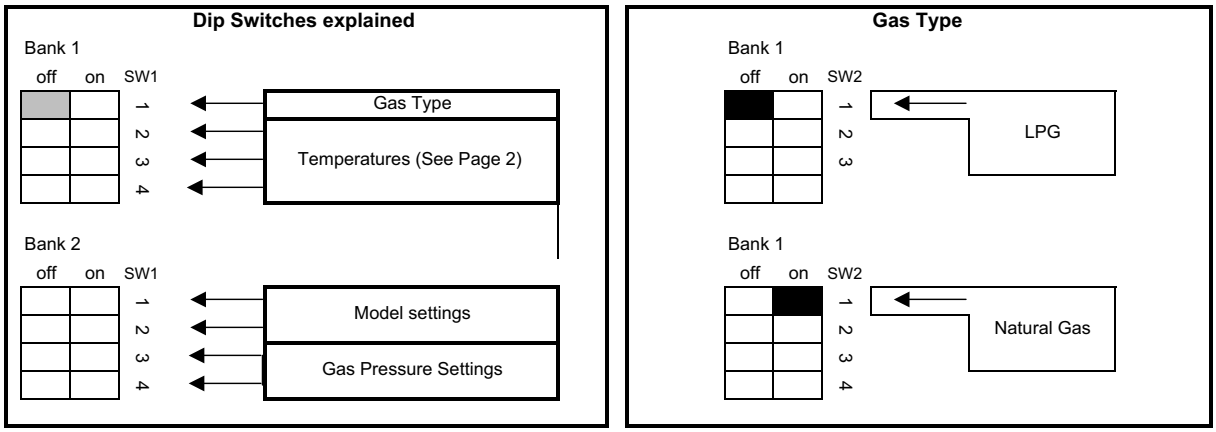


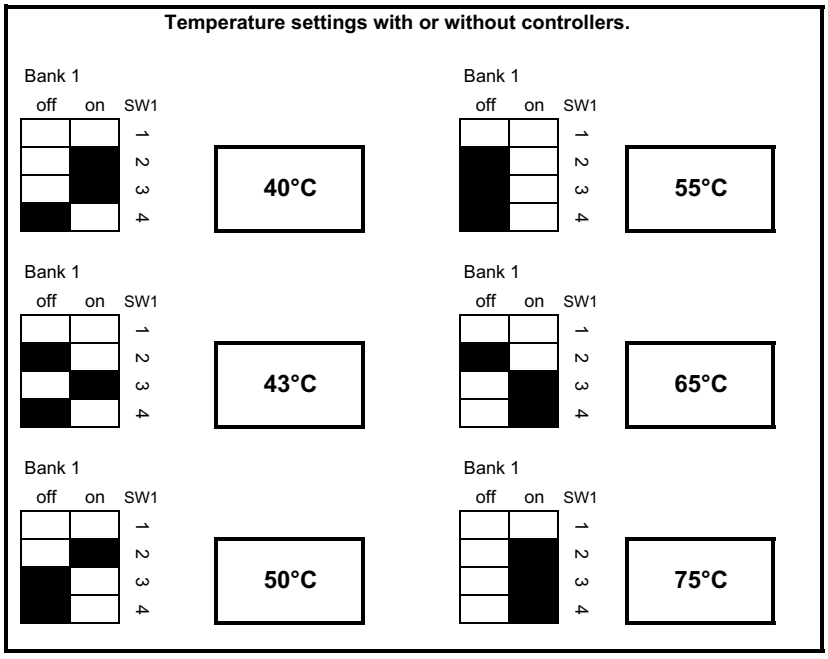
11. Wiring Diagram

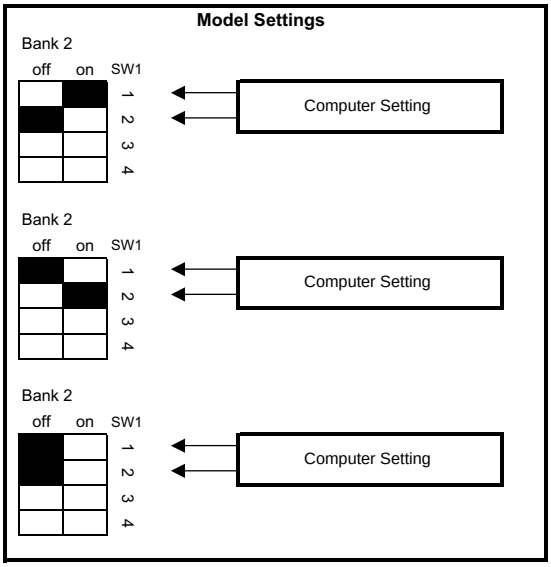


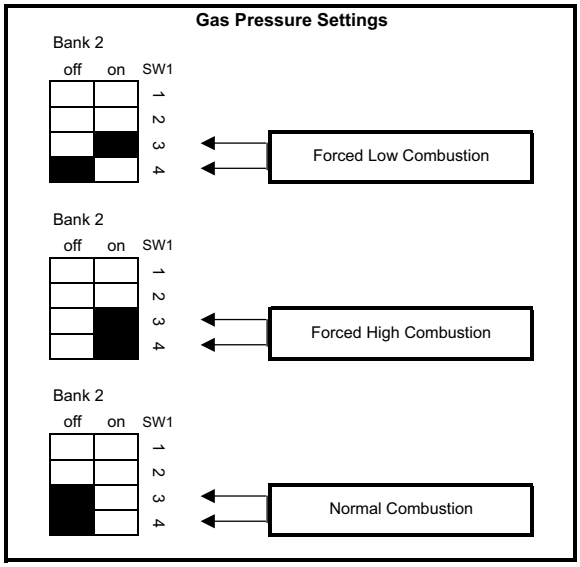
12. Dip Switch Settings

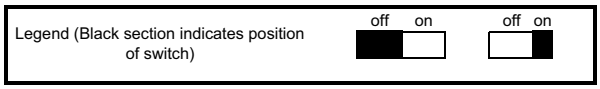
Dip Switch Settings 16e, 20e







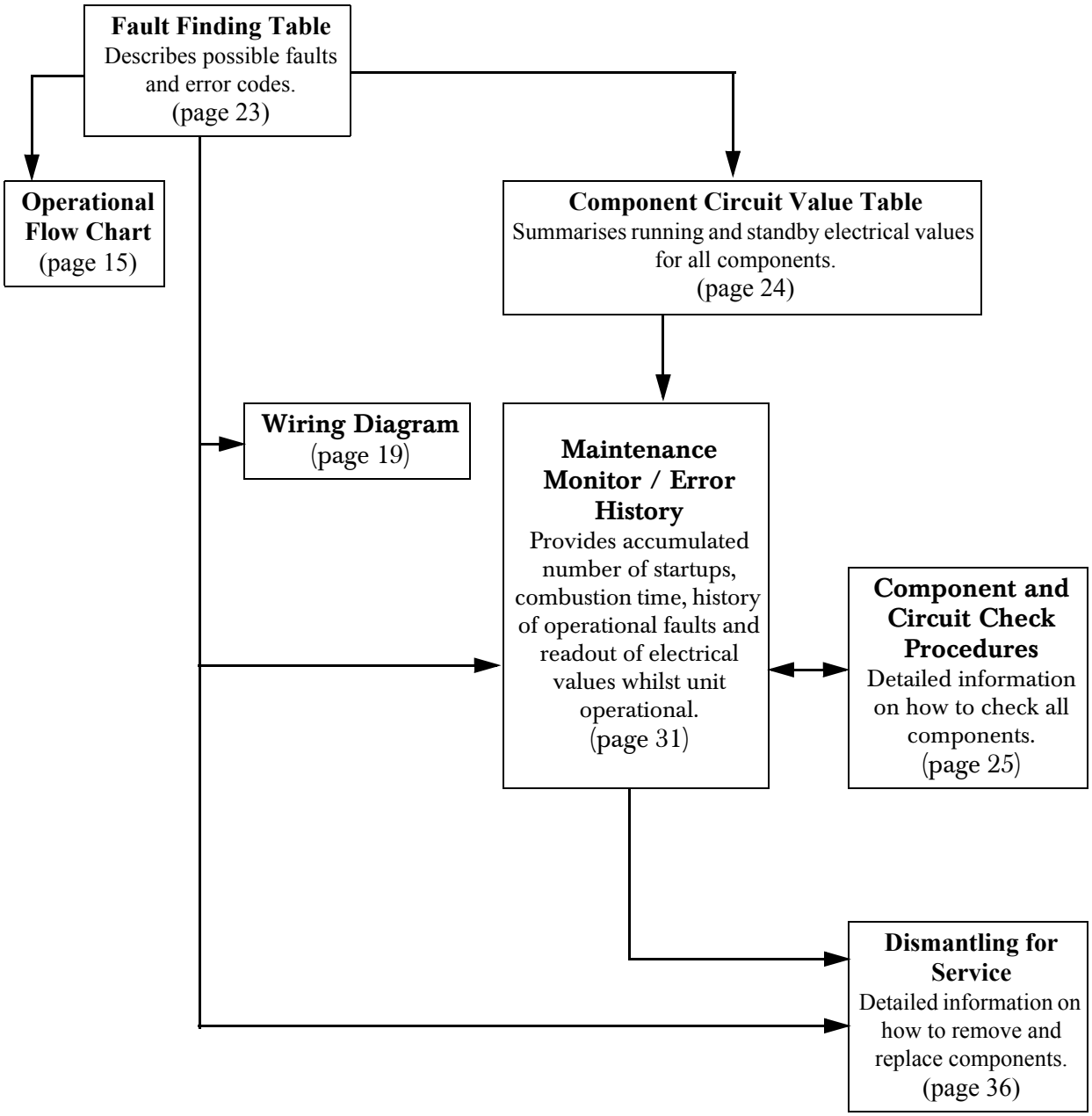




13. Fault Finding

If there is a fault with the appliance, and controllers are installed, a numerical fault code may appear on the digital display controller. If controllers are not installed, one may be fitted to find out the fault code. Fault finding without controllers (and thus fault codes) is possible but more time consuming.

To diagnose and rectify faults, the **Fault Finding Table** is used as illustrated below:


Fault Finding Table
Describes possible faults and error codes.
(page 23)
Operational Flow Chart
(page 15)
Component Circuit Value Table
Summarises running and standby electrical values for all components.
(page 24)
Wiring Diagram
(page 19)
Maintenance Monitor / Error History
Provides accumulated number of startups, combustion time, history of operational faults and readout of electrical values whilst unit operational.
(page 31)
Component and Circuit Check Procedures
Detailed information on how to check all components.
(page 25)
Dismantling for Service
Detailed information on how to remove and replace components.
(page 36)

Fault Finding Table

Code on Controller	Fault	Table	Action
03	Power interruption during Bathfill. Water will not flow when power restored.		1. Turn off all hot water taps.
			1. Press the ON/OFF button on a controller twice.
10	Combustion fan current too high. Unit operates, then stops.	E	1. Check blockage of air intake/flue outlet.
			2. Check combustion fan.
11	No ignition. Unit stops without flame igniting	C	1. Check gas supply
			2. Check sparker unit
			3. Check gas valves
12	Flame Failure / Earth Leakage		1. Check gas supply
			2. Check flame rod
			3. Check earth wire lead
			4. Check remote control
14	Thermal fuse and/or overheat switch activated. Unit operates, then stops.		1. Check thermal fuse
			2. Check overheat switch
			IMPORTANT- If thermal fuse or overheat switch were faulty : a. Check heater for damage b. Confirm “Gas Type” and “Combustion” dip switch settings (page 20) c. Confirm test point pressures (page 33).
16	Over temperature warning. Unit operates, then stops.		1. Confirm “Gas Type” and “Combustion” dip switch settings (page 20)
			2. Confirm test point pressure (page 33)
		C	3. Check gas valves
		D	4. Check water flow sensor
		B	5. Check water flow servo
		A	6. Check heat exchanger outlet temperature thermistor
			7. Check hot water outlet temperature thermistor
32	Outlet water thermistor flow	A	Check hot water outlet thermistor
33	Heat exchanger thermistor error	A	Check heat exchanger thermistor
52	Modulating solenoid valve fault. Unit stops without flame ignition.	C	Check modulating solenoid valve
61	Combustion fan rotation error	E	Check combustion fan
65	Water flow control device error. Water flow is not controlled. Water temperature too low.	B	Check water flow servo
71	Solenoid valve circuit error. Unit does not operate.	C	Check gas valves
72	Flame rod circuit error. Unit does not operate.		Check flame rod
-	Appliance does not operate at all. No display on the remote controllers (if fitted).		1. Check power cord plugged in and supply turned on.
			2. Check power supply voltage.
			3. Check electrical fuse.
			4. Check transformer.
		C	5. Check gas valves
			6. Check sparker unit.
			7. Check earth leads and connections.
			8. Check for short circuits.
			9. Check remote controller(s) - if fitted.
-	No combustion despite remote control indicating that combustion is occuring - if remote controller(s) fitted.	D	1. Check water flow sensor.
			2. Check flame rod.
		A	3. Check heat exchanger outlet thermistor.
		A	4. Check hot water outlet thermistor.
		E	5. Check combustion fan.
			6. Check the sparker unit.
		C	7. Check gas valves.
			8. Check thermal fuse.
			9. Check overheat switch.
			IMPORTANT - If thermal fuse or overheat switch were faulty: a) check heater for damage; b) confirm “Gas Type” and “Combustion” dip switch settings; c) confirm test point pressure.
-	Combustion stops during operation.		1. Check gas supply
			2. Check flame rod
			3. Check earth leads and connections.
-	Cannot adjust the hot water temperature via the controller(s) - only if controller(s) fitted.	A	1. Check hot water outlet thermistor.
			2. Check heat exchanger outlet thermistor.
		C	3. Check gas valves
		B	4. Check water flow servo.
			5. Check bypass servo.
-	Anti-frost heater does not operate.	F	1. Check anti-frost heater components
			2. Check frost sensing switch

14. Component Circuit Value Table

Table reference	Component	Measurement Point		Normal Value	A Note
		CN	Wire Colour		
	Surge Protection		B-Br	AC207~264V	
	Water Flow Control Device	G_1	R(CN2-NO.4)-B	±DC11~13V (Only When Operating)	Operate Electricity
			R(CN4-NO.5)-Bk	DC11~13V	Control Electricity
			Bk-Y	Below DC1V (Limiter On)	Full Open Position
				DC4~6V (Limiter Off)	
			Bk-Br	Below DC1V (Limiter On)	Full Close Position
				DC4~6V (Limiter Off)	
	Remote Control	D	(TERMINAL)	DC11~13V	
3	Water Flow Sensor	B_2	R-Bk	DC11~13V	On 2.4L/min (33Hz) Over 1980 PULSE/min Off 1.7L/min (23Hz) Below 1380 PULSE/min
			Y-Bk GND	DC4~7V (Pulse 20~320Hz)	
8	Combustion Fan	A_1	R-Bk	DC15~46V	
			Y-Bk	DC11~13V	
			W-Bk GND	DC5~10V (33~400Hz)	
	Flame Rod	B_5	Y-FLAME ROD	Over DC1μA	Flame Condition
	Modulating Valve	B_6	P-P	DC2~15V 65~85Ω	
2	Outgoing Thermistor	B_1	W-W	15° C··· 11.4 ~14.0kΩ 30° C··· 6.4 ~ 7.8kΩ 45° C··· 3.6 ~ 4.5kΩ 60° C··· 2.2 ~ 2.7kΩ 100° C··· 0.6 ~ 0.8kΩ	
	Thermal Fuse	B_3 B_4	R-R R-Bk	Below 1Ω	
	Igniter	C_1	Gy-Gy	AC90~110V	
7	Main Solenoid Valve	E_1	P-Bk	DC80~100V 1.7~2.1kΩ	
	Solenoid Valve 1 (Small)	E_2	B-Bk	DC80~100V 1.7~2.1kΩ	
	Solenoid Valve 2 (Large)	E_3	Y-Bk	DC80~100V 1.7~2.1kΩ	
1	Transformer	F	R-R	AC90~110V 11~13kΩ	
		F_1	B-Br	31~36kΩ	
10	Valve Heater	F_5	Y-Y	1kΩ	
	Pipe Heater	F_6	Y-Y	125kΩ~156kΩ	Pipe Heater Only
10	Fan Current 16e	Gas Type	Current	On High	On Ignition
		Prop Nat	660 ± 66mA 585 ± 59mA	297Hz / 4455rpm 279Hz / 4185rpm	180Hz / 2700rpm 180Hz / 2700rpm
10	Fan Current 20e	Gas Type	Current	On High	On Ignition
		Prop Nat	845 ± 85mA 770 ± 77mA	308Hz / 4620rpm 290Hz / 4350rpm	195Hz / 2925rpm 195Hz / 2925rpm
4	Gas Secondary Pressure			Secondary	
	Gas Type	Primary		High	Low
	Propane Natural	37 mbar 20 mbar		8.1 mbar 8.8 mbar	1.8 mbar 1.8 mbar

15. Component and Circuit Checks

1. Combustion Fan Circuit

Check the Motor

Check the combustion fan if the error indicator displays “61”.

Measure voltages between Black and Red of the PCB connector (A).

Normal: DC15~46V (when fan ON)
DC0V (when fan OFF)
If normal proceed to check the rotation sensor
Faulty: Replace PCB

Check for the Fan Rotation Sensor

a.) Measure voltages between Black and Yellow of connector (A).
Normal: DC11~13V
If normal proceed to b.).
Faulty: Replace PCB.

b.) Measure voltages between Black and White of connector (A).
Normal: DC5~10V
If normal proceed to Sparker Circuit 2.
Faulty: Replace Combustion Fan.

2. Sparker Circuit

a.) Measure voltages between Grey and Grey of connector (C_1).
Normal: AC90~110V
If Normal proceed to b.).
Faulty: Replace PCB.

b.) Disconnect connector (C_1) and measure resistance between both terminals of the sparker.
Normal: 1MΩ
If not sparking, adjust or replace ignition plug.
Faulty: Replace Sparker.

3. Main Solenoid Valve (SV_1) Circuit

Check the main solenoid if error indicator “11” is displayed.

a.) Disconnect Main Solenoid connector (E_1) and measure resistance between Pink and Black
Normal: 1.7 ~2.1kΩ
If normal, proceed to b.).
Faulty: Replace Main Solenoid.

b.) Measure voltage between Pink-Black of Main Solenoid connector.

Normal: DC80~100V
If normal, proceed to Solenoid Valve SV_2
Faulty: Replace PCB.

4. Solenoid Valve 1 (SV_2) Circuit

Check Solenoid 1 if error indicator "11" is displayed.

a.) Disconnect Solenoid 1 connector (E_2) and measure resistance between Blue and Black.

Normal: 1.7 ~2.0kΩ
If normal, proceed to b.
Faulty: Replace Solenoid 1.

b.) Measure voltage between Blue and Black of Solenoid 1 connector.

Normal: DC80~100V
If normal, proceed to Solenoid Valve 2 (SV_3) Circuit
Faulty: Replace PCB.

5. Solenoid Valve 2 (SV_2) Circuit

a.) Disconnect Solenoid Valve 2 connector (E_3) and measure resistance between Yellow and Black.

Normal: 1.7 ~2.1kΩ
If normal,, proceed to b.).
Faulty: Replace Solenoid Valve 2.

b.) Measure voltage between Yellow and Black of Solenoid Valve connector.

Normal: DC80~100V
If normal, proceed to Thermal fuse Circuit.
Faulty: Replace PCB.

6. Modulating Valve Circuit

a.) Disconnect Modulating Valve fasten terminals and measure resistance between terminals.

Normal: 65~85Ω
If normal, proceed to b.).
Faulty: Replace Modulating Valve.

b.) Measure voltage between Pink and Pink of Modulating Valve fasten terminal.

Normal: DC2.0~15V
If normal, proceed to c.).
Faulty: Replace PCB.

c.) Check the gas secondary pressure change when set temperature on the remote control changes from 37°C to 55°C.

Normal: If secondary pressure changes, go to Water Flow Servo Circuit.
Faulty: Replace Modulating Valve.

7. Flame Rod Circuit

Check flame rod.

Disconnect flame rod terminal (B_5), and re-operate.

"72" indicated:- Proceed to 3.
"72" is not indicated:- check for electrical leaks from the flame rod.

Measure resistance between flame rod terminal (B_5) and appliance earth.

Normal: >1MΩ
If normal, replace PCB.
Faulty: Replace flame rod.

a.) Remove the Flame Rod terminal (B_5) repeat operation procedure, if "72" is displayed again check the Hot water outlet thermistor.
If "72" is not displayed check current leakage from the Flame Rod.

b.) Measure voltage between body earth and Flame Rod terminal (B_5).

Normal: Voltage AC100~160V
If normal, replaced PCB
Faulty: Replace Flame Rod.

c.) Check if the Flame Rod is securely fitted.

Normal: replace the PCB
Faulty: Adjust the fitting of the Flame Rod

8. Earth Lead

Confirm the Earth Lead connection is secure (at round terminal), and check for broken or short circuits in the lead.

If normal, check other possible causes for flame failure (is gas valve open?, is the filter blocked? etc.).
If faulty, tighten the earth lead, PCB, power cord and surge arrester.

9. Thermal Fuse Circuit

Check the Thermal Fuse.

Disconnect relay connector ($B_{3,}$) and measure resistance between Black and Red.

Normal: < 1Ω
If normal, replace PCB.
Faulty: Replace Thermal Fuse if after confirming there is no damage to the appliance.

10. Overheat Switch Circuit

Measure resistance between Overheat Switch terminals. (B_4).

Normal: < 1Ω
If normal, replace PCB.
Faulty: Replace Overheat Switch.

Note: If Thermal fuse or Overheat Switch were faulty.

a.) Check heater for damage

b.) Confirm gas type and combustion dipswitch settings

c.) Confirm test point pressure.

11. Water Flow Sensor

a.) Measure voltage between Red - Black of relay connector (B_2).

Normal: DC 11~13V
If normal, proceed to b.
Faulty: Replace PCB.

b.) Measure voltage between Yellow - Black of relay connector (B_2).

Normal: DC 4~7V
If normal, proceed to 2.
Faulty: Replace water flow sensor.

Note: For controller readout of water flow whilst operational refer maintenance monitor. (Chapter 17) No. 1.

12. Water Flow Servo Circuit

a.) Disconnect relay connector (G1), and measure voltage between Red (+) and Black (-) on PCB unit side.
Normal: DC11-13V
If normal: proceed to c.).
Faulty: Replace PCB unit.

b.) Measure voltage between Black and Yellow with relay connector (G_1) connected (with no water flowing, water flow servo fully open).

Normal: DC4~6V
Faulty: Replace Water Flow Servo with Water Flow Servo.

c.) Measure voltage between Black and Brown with relay connector (G_1) connected (with no water flowing, water flow servo fully open).

Normal: DC4~6V
Faulty: Replace Water Flow Servo and Water Flow Sensor.

13. Hot Water Outlet Thermistor Circuit

Check Hot Water Thermistor if error code "32" is displayed.

Disconnect relay connector (B_1) and measure resistance White -White.

When disconnected: resistance >1MΩ
When short circuit: resistance > 1 Ω
Normal: Check Heat exchanger outlet thermistor

Faulty: Replace hot water outlet thermistor.

Normal

Temp.	15°C	30°C	45°C	60°C
Resistance	11.4~14 kΩ	6.4~7.8 kΩ	3.6~4.5 kΩ	2.2~2.7 kΩ

If normal proceed to Flame Rod circuit.

Faulty: Replace the Hot water Outlet Thermistor.

Note: For controller readout of thermistor temperature whilst operational refer maintenance monitor.

Disconnect relay connector (B_1) and measure resistance White -White.

14. Surge Protector

Check the fuse.

a.) Unplug the power plug.

b.) Check whether or not the fuse (3A) x 2 has blown by measuring the resistance.

Normal: <1Ω
If normal go to step Electrical Fuse 13.
Faulty: Replace fuse/s (3Ax2). Check for a short next time it's turned off.

15. Electrical Fuse

a.) Measure voltage between Blue and Brown on the connector (F_2)

Normal :AC 207~264V
If normal proceed to b.). (11~13Ω)
Faulty: Check if voltage on the fuse terminal is AC207~264V

b.) Measure voltage between white and white on the (F_1).

Normal: AC207~264V.
Faulty: replace surge protector unit.

16. Transformer

Check for the transformer

a.) Measure the voltage between white and white on the transmission connector (F).

Normal: AC207~264V (11~13 Ω)
If normal proceed to b.). (11~13Ω)
Faulty: Check if the voltage on fuse terminals is AC207-264V.

17. Remote Control

Check the voltage between the 2-core remote control cable.

Measure the voltage between terminals on the remote control terminal (D).

Normal: DC 11~13V
If normal, replace the remote control after confirming that the cable hasn't been damaged or shorted.

Faulty*:* Because normal voltage is not given due a short circuit, despite the PCB being in normal state, check Water Flow Servo circuit.
If solution is not given from the above replace PCB.

18. Anti-frost Heater Circuit

a.) Disconnect relay connectors (F_4) and (F_5) and measure resistance between Yellow and Yellow on heater side (water flow servo and HW connection).

Normal: 53Ω
If normal, proceed to b.).
Faulty: Replace Valve Heater.

b.) Disconnect relay connector (F_4) and (F_5) and measure resistance between Yellow and Yellow on each connector on heater side.

Normal: 618Ω
If normal, proceed to c.).
Faulty: Replace Anti-frost Heater.

19. Frost Sensing Switch

a.) Disconnect relay connector (F_4) and measure resistance between Blue and Blue.

Normal: < 1Ω
If normal, check wiring (AC240V circuit).
Faulty: Replace Frost Sensing Switch.

16. Maintenance Monitor / Error History

INFINITY 20e

INFINITY 16e

A deluxe controller (MC70-2A) should only be fitted to the above water heater models, for the purpose of enabling service personnel to locate the error history and fault find operational appliances.

NB. Use only one controller, when accessing the maintenance information, error history, as two or more remote controls may cause incorrect operation.

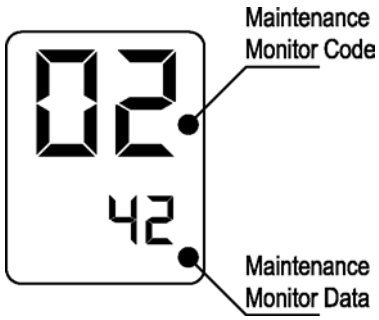
To display Maintenance Information

1. With the controller in the "OFF" position press the Water Temperature "DOWN" (Cooler) button while holding the "ON/ OFF" button to activate the maintenance monitor. Press the "ON/ OFF" button a second time to set the controller in the "ON" mode. This feature can now be used with the appliance in operation.

2. The maintenance number will be shown in the Water Temperature display.

3. Data will be shown in the Clock display.

4. To select the required maintenance number, press the Water Temperature "UP" and "DOWN" buttons.



Display Monitor Contents			
No.	Contents	Units	Data Range
01	Water flow sensor recognition flow (Example 123 = 12.3L/min).	0.1L/min	0~400
02	Hot water Outlet thermistor temperature (Example 20 = 20° C)	° C	0~999
03	Hot water combustion time (Example 6 = 600 hours)	100 hours	000~999
04	Hot water operation frequency (Example 6 = 600 Operations)	100	0~999
05	Hot water fan frequency	Hz pulses/sec	0~999 ***Note 1**

***Note 1** Fan Frequency rpm Conversion

(rpm) = (Hz) x15

06	Remote control connection	none	0 or 1 ***Note 2**

***Note 2** Remote Control Connections

Bathroom Remote

Additional remotes Kitchen remote

"0 1 1"

Controls connected	Display
No	"0"
Yes	"1"

07	Water flow servo present recognising positioning	None	0~2 ***Note 3**

***Note 3** Water Flow Servo Positioning

Servo Position	Open	Centre	Closed
Display	**"1"**	**"0"**	**"2"**

08	Inlet water temperature (PCB recognition value) (Example 25 = 25°C)	°C	0~999
09	Hot water fan current flow value (Example 6 x 10 = 60 mA)	10 mA	0~999
10	Bath fill amount (this counts the litres during bath fill operation).	Litres	0~999

To return to normal operation

- Press the ON/OFF button again while holding down the Water Temperature "DOWN" (Cooler) button.

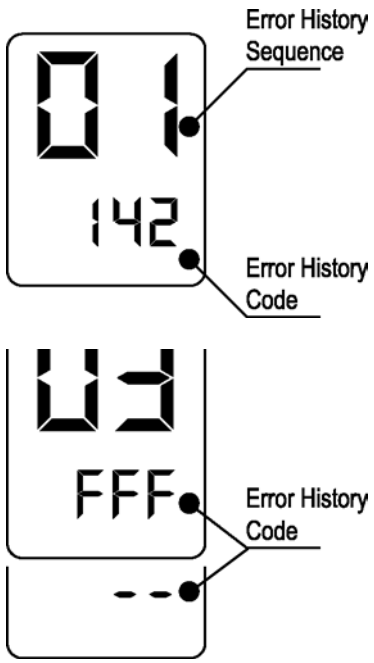
Error History

To Display Error Memory (History)
(This feature will show the last 10 faults in sequence)

1. Turn off at the ON/OFF button. (This can be done during operation)

2. Press the ON/OFF button while holding the Water Temperature "UP" (Hotter) button.

   - The Sequence will be shown in the Water Temperature display.
   - Error Code will be shown in the Clock display. (See service Manual for error codes).
   - Where there are less than a total of 9 errors, "FFF" or " - - " will be displayed in the Clock display.



To return to normal operation.

- Press the ON/OFF button again while holding the Water Temperature "UP" (Hotter) button.
- This feature will automatically shut down after 3 minutes.

17. Gas Pressure Setting Procedure

The regulator on the Infinity is electronically controlled and factory pre-set. Under normal circumstances it **does not** require adjustment during installation. Perform this procedure only if the unit is not operating correctly and **all** other possible causes for incorrect operation have been eliminated.

1) Turn 'OFF' the gas supply

2) Turn 'OFF' 240V power supply.

3) Remove the appliance cover.

4) Check gas type switches (fig. 1) are in the correct position (dip switch 1 of SW2 'ON' = NG, 'OFF' = LPG).

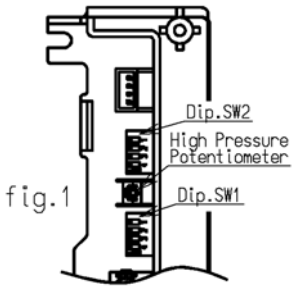


fig.1

5) Attach pressure gauge to burner test point, located on the gas control. (fig. 2).

6) Turn 'ON' the gas supply.

7) Turn 'ON' 240V power supply.

8) If remote controllers are fitted, turn the unit 'ON' at the kitchen controller, select the maximum delivery temperature of 55°C and open a hot water tap fully. (**CAUTION: Ensure building occupants do not have access to hot water outlets during this procedure).**

9) Set the Infinity to 'Forced Low' combustion by setting No. 3 dipswitch of the (SW1) set of dip switches to 'ON'. (fig 3)

10) Check the burner test point pressure.

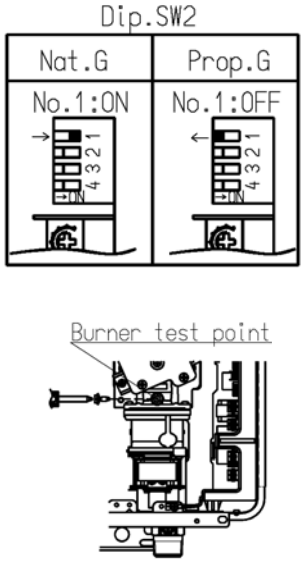


fig.2

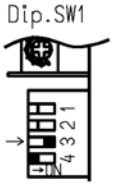


fig.3

Pressure Setting Low

Unit	Nat. G	LPG
16e	1.8	1.8
20e	1.8	1.9

all units in mbar

Table.1

11) Remove rubber access plug and adjust the regulator screw on the modulating valve (fig. 4) as required to the pressure. Table 1. Replace rubber access plug.

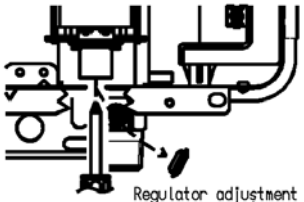


fig. 4

12) Set the Infinity to 'Forced High' combustion by setting both No. 3 and No. 4 dip switches of the bottom (SW1) set to 'ON'. (fig. 5) ensure maximum water flow.

13) Check the burner test point pressure.

14) Adjust the high pressure Potentiometer (POT) on the Printed Circuit Board (PCB) as required to the pressure shown Table 2. (fig. 1).

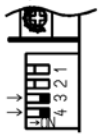


fig.5

Pressure Setting High

Unit	Nat G	LPG□
16e	8.8	8.1□
20e	9.2	8.4□

all units in mbar

Table.2

15) **IMPORTANT**: Set dip switches No's 3 and 4 on the bottom (SW1) set of dip switches to 'OFF' to return the appliance to 'Normal' combustion. (fig. 6).

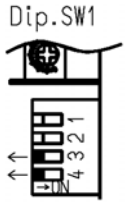


fig.6

16) Close hot water tap.

17) Turn OFF the gas supply and 240V power supply.

18) Remove pressure gauge, and replace sealing screw.

19) Turn 'ON' the gas supply and 240V power supply.

20) Operate unit and check for gas leaks at test point.

21) Replace the front cover of the appliance.

Warning

DURING PRESSURE TESTING OF THE INSTALLATION ENSURE GAS COCK SITUATED BEFORE UNIT IS SHUT OFF.

FAILURE TO DO SO MAY RESULT IN SERIOUS DAMAGE TO THE APPLIANCE AND POSSIBLE INJURY.

18. Gas Conversion Procedure

Conversion Method

Warning-Ensure that the power cords is disconnected from the power point (240V potential) and isolate gas supply.

1. Remove outer cover, 4 screws.
2. Delete "Natural" from the combustion chamber cover and replace with "Propane". (Use a black marking pen).
3. Delete gas type from small paper sticker on bottom edge of inner casing.
4. Replace small gas label on gas inlet.
5. Replace large gas label on top of appliance.
6. Place "Propane" very small gas label over "Natural" on Data Plate.
7. Lift PCB protective plastic cover up.
8. Disconnect Flame rectification and sparker leads (2). (if needed)
9. Remove manifold, 9 screws.
10. Disconnect leads to solenoid (Polarized Plug).
11. Remove Natural Gas manifold.
12. Place the Propane manifold in the correct location ensuring,
    - The "O" rings are correctly positioned
    - No wires are trapped.
    - Manifold is marked with the correct gas type. (“A” for Propane)
13. Carefully replace the 9 screws to secure the manifold (Including the Wire ties)
    - Reconnect the Solenoids Wires (Polarized plug Brown and Black wires).
14. Refit flame rectification and sparker leads (2).
15. Connect appliance to gas, water.
16. Check for gas escapes.
17. Connect the appliance to the electricity.
18. Follow gas pressure setting and dipswitch setting procedures (see next page).
19. Disconnect appliance from services.
20. Replace front cover, star washer must be on bottom right hand screw

19. Dismantling for Service

240 volt potential exposure. Isolate the appliance and reconfirm with a multimeter.

Item *Page*

1. Removal of the **Front Panel** 37
2. Removal of the **PCB Unit** 37
3. Removal of the **Water Flow Sensor, Servo and Bypass Servo** 37
4. Removal of the **Sparkers** 47
5. Removal of the **Combustion Fan** 47
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7. Removal of the **Transformers** 48
8. Removal of the **Gas Inlet, Solenoids and Flame Rod** 48
9. Removal of the **Gas Control** 49
10. Removal of the **Heat Exchanger** 49
11. Removal of the **Thermal Fuse and OHS** 49

Unless otherwise stated, re-assembly is the reverse of dismantling.

IMPORTANT

For some areas of dismantling you may need to isolate any or all of the following:

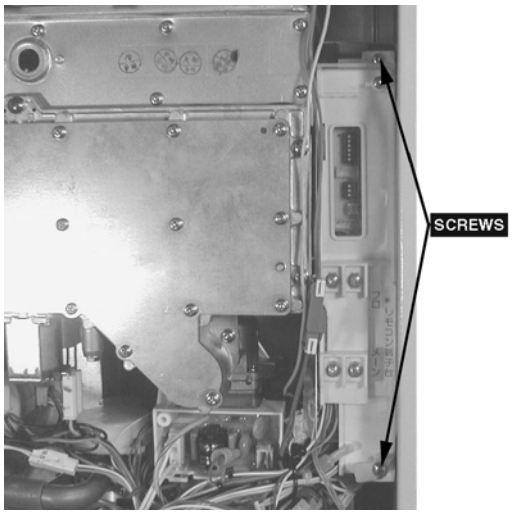
* Isolate gas supply.
* Disconnect electrical supply from wall socket.
* Isolate water supply.
* Drain **all** water from appliance.

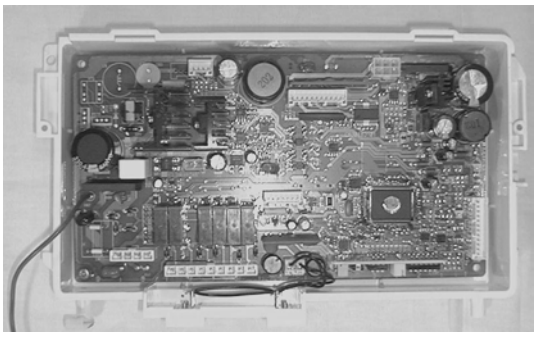
1) Removal of **Front Panel**

a. Remove four (4) screws.

2) Removal of the **PCB Unit**

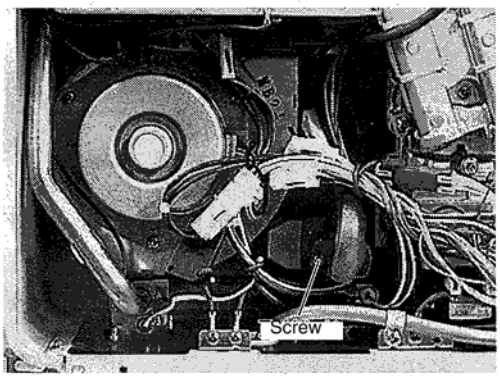
a. Remove the front panel. (Refer Item 1.)
b. Remove one (1) screw and take off plastic cover.
c. Remove two (2) screws and take off earth wire.
d. Remove two (2) screws and pull out two (2) red wires from transformer.
e. Remove two (2) screws and pull off PCB unit.
f. Remove connectors from PCB unit.

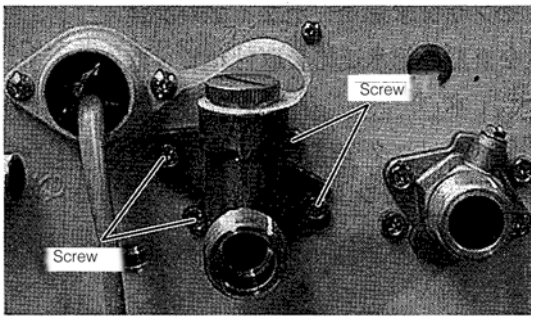




3) Removal of the **Water Flow Sensor and Servo.**

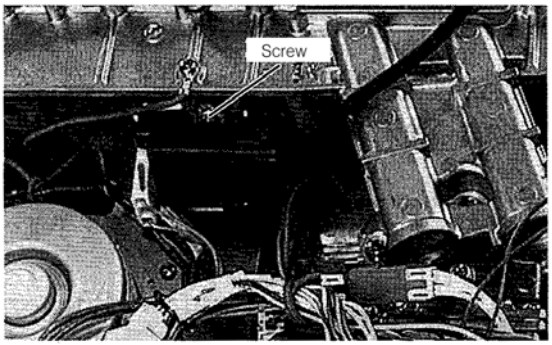
a. Remove one (1) screw and pull off heat exchanger inlet water connection tube.
b. Remove lock bracket and pull off inlet water connection tube. Ensure O- ring not lost or damaged.





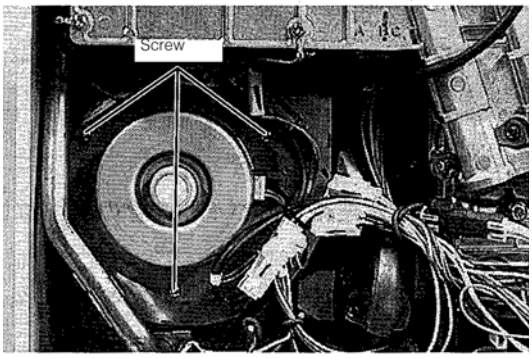
4) Removal of **Sparker**

a. Remove connector from sparker.
b. Remove screw from sparker and take out sparker.
c. Pull off high tension lead.



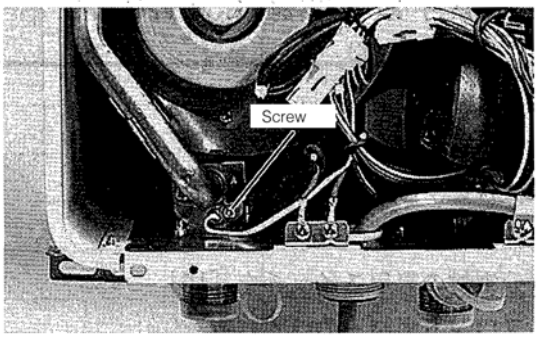
5) Removal of **Fan Motor**

a. Remove screws three (3) and pull off combustion fan.
b. Remove connector (4P).



6) Removal of **Outgoing Water Thermistor**

a. Remove one (1) screw of Heat Exchanger outlet water tube.
b. Unlock bracket and pull off inlet water tube. Ensure O-ring is not lost or damaged.
c. Remove one (1) screw and pull off outgoing water thermistor.

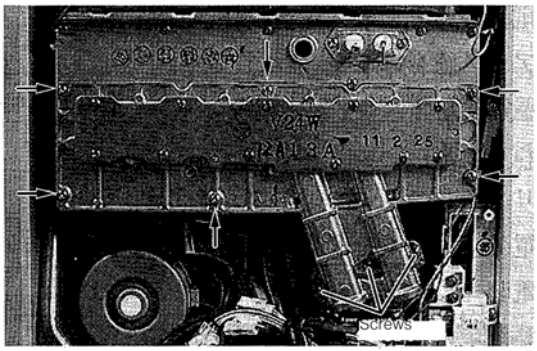


7) Removal of **Transformer**

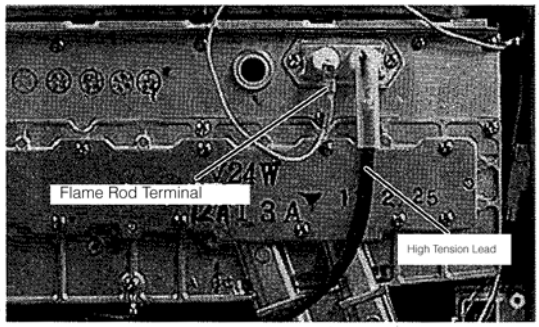
a. Remove PCB (refer item 2)
b. Remove two (2) screws and pull off transformer.

8) Removal of **Manifold and burner**

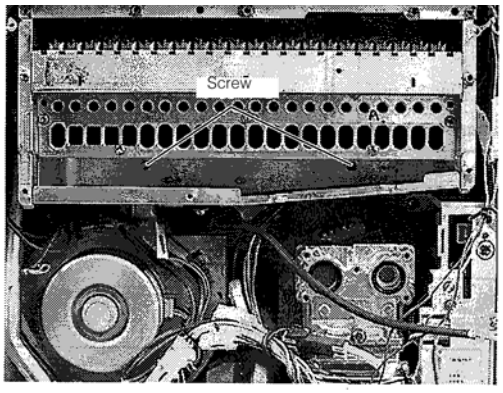
a. Remove screws (6 + 3) and pull off manifold.



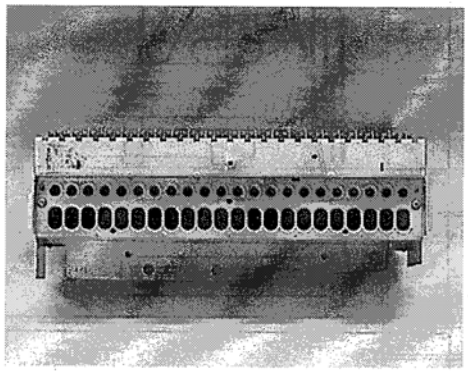
a. Remove flame rod terminal (yellow)
b. Remove combustion chamber front panel (6 screws)

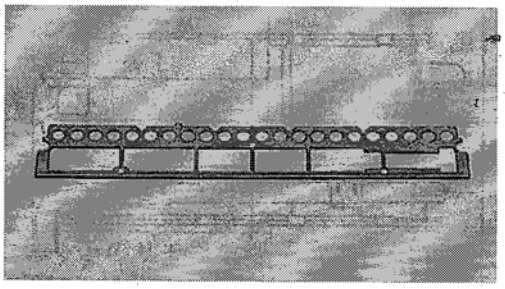


c. Remove two (2) screws and pull off the burner unit.



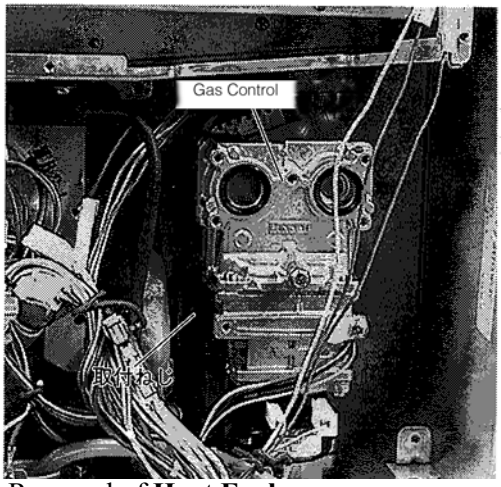
d. Remove three (3) screws and pull off damper





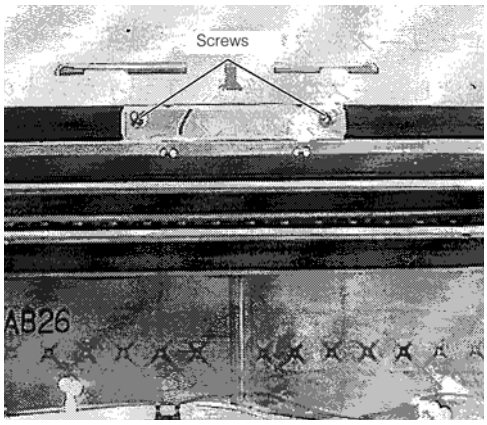
9) Removal of **Gas Control**

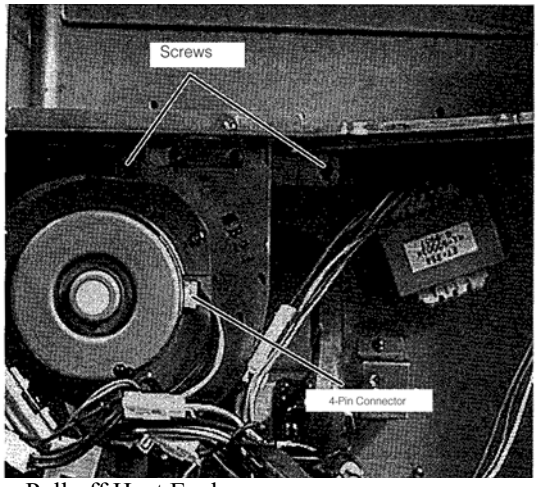
a. Remove manifold (refer item 8)
b. Remove front panel (4 screws). (refer item 1).
c. Remove four (4) screws on gas connection inlet and gas control (assy), and pull out the gas connection. Handle O-ring carefully.



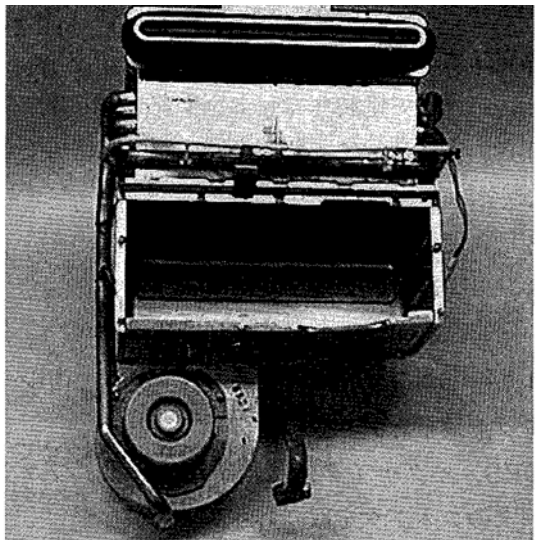
10) Removal of **Heat Exchanger**

a. Remove PCB (refer item 2)
b. Remove Heat Exchanger inlet water tube (refer item 3)
c. Remove outlet water tube (refer item 6).
d. Remove three (3) screws from the manifold (refer item 8).
e. Pull off high tension lead and flame rod terminal (refer item 4).
f. Remove connectors of OHS, Sparker, Anti Frost heater and fan motor.
g. Remove four (4) screws from heat exchanger.





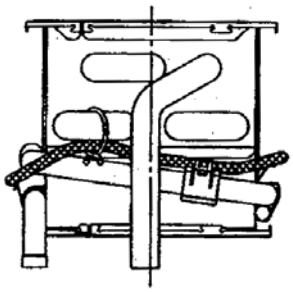
h. Pull off Heat Exchanger



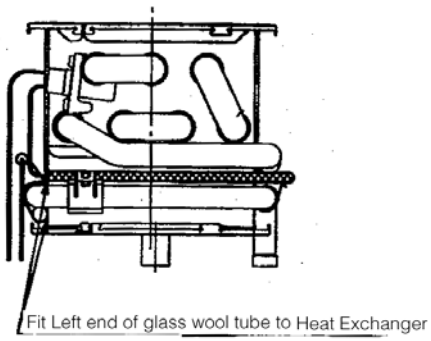
11) Removal of **Thermal Fuse**

a. Pull off heat exchanger (refer item 10).
b. Remove thermal fuse .

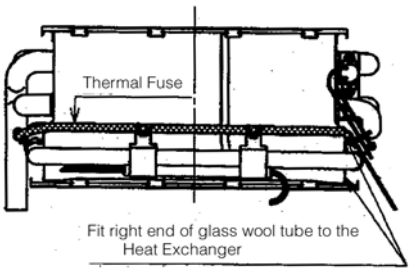
When Thermal Fuse is replaced, mount the thermal fuse as follows:



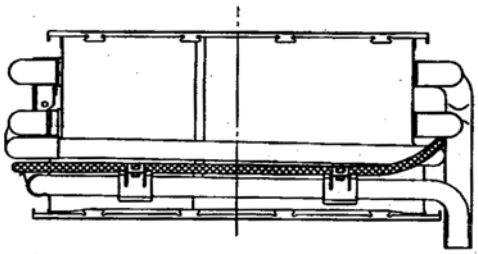
Heat Exchanger LH side



Heat Exchanger RH side



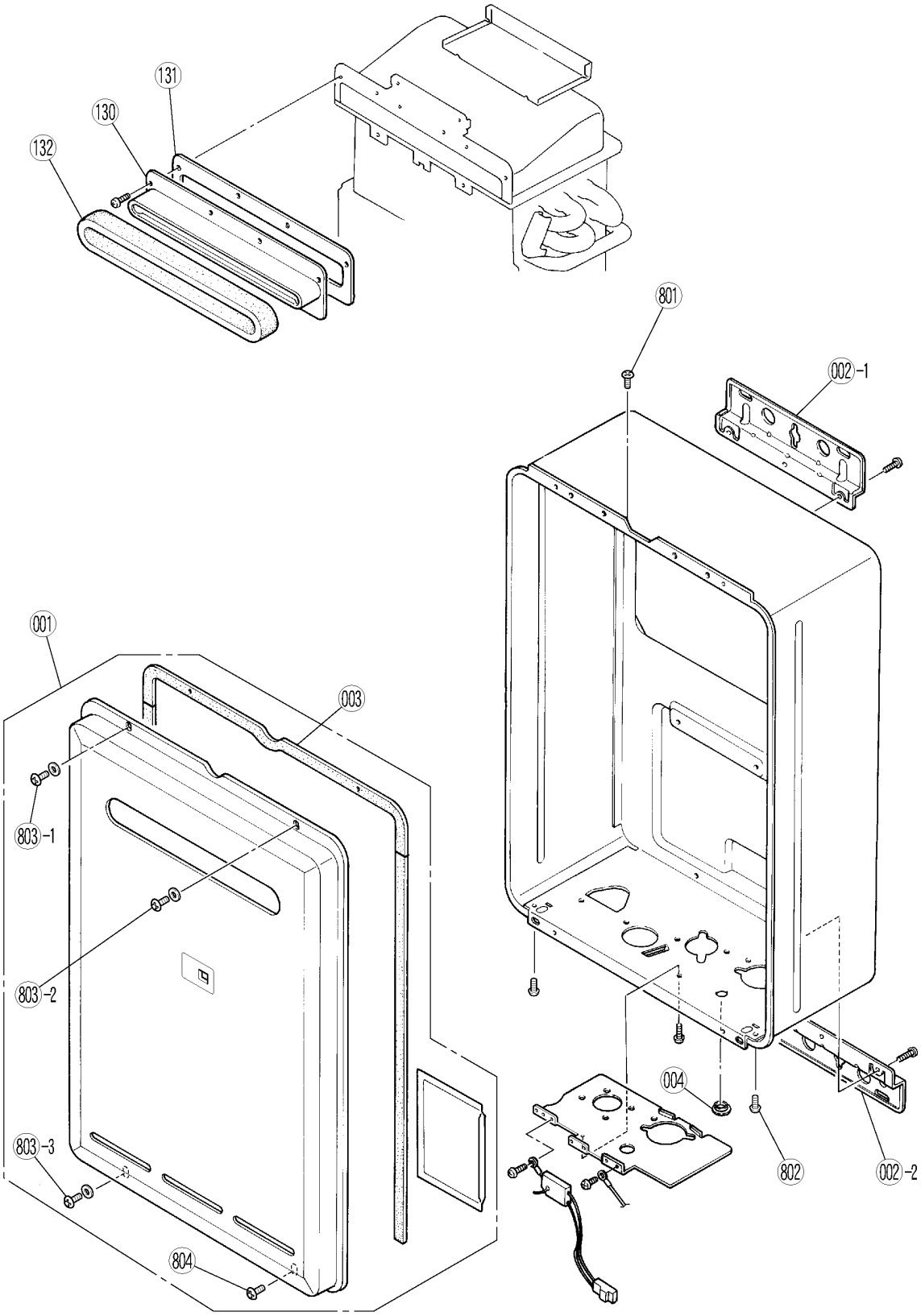
Heat Exchanger Front



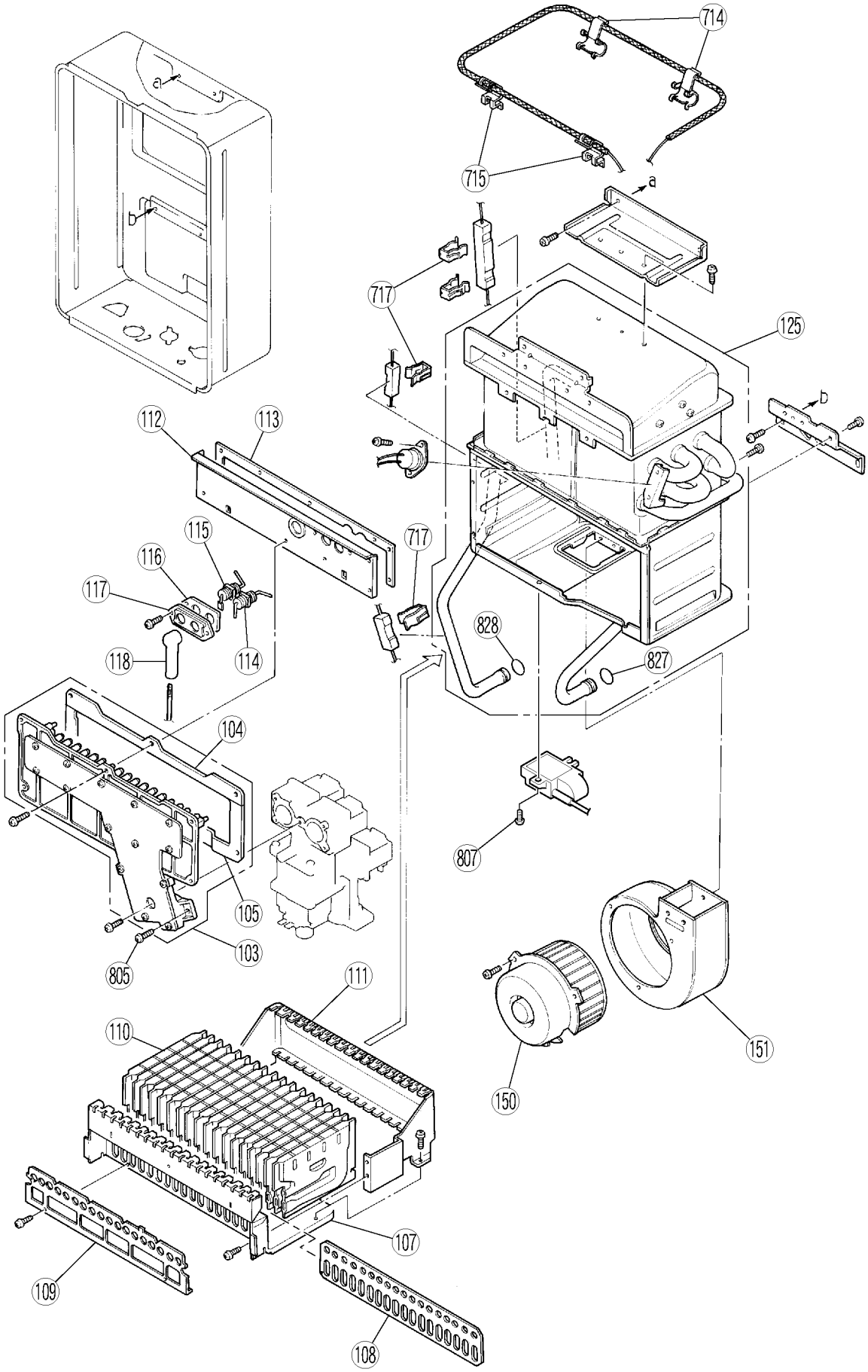
Heat Exchanger Back

20. Exploded Diagram

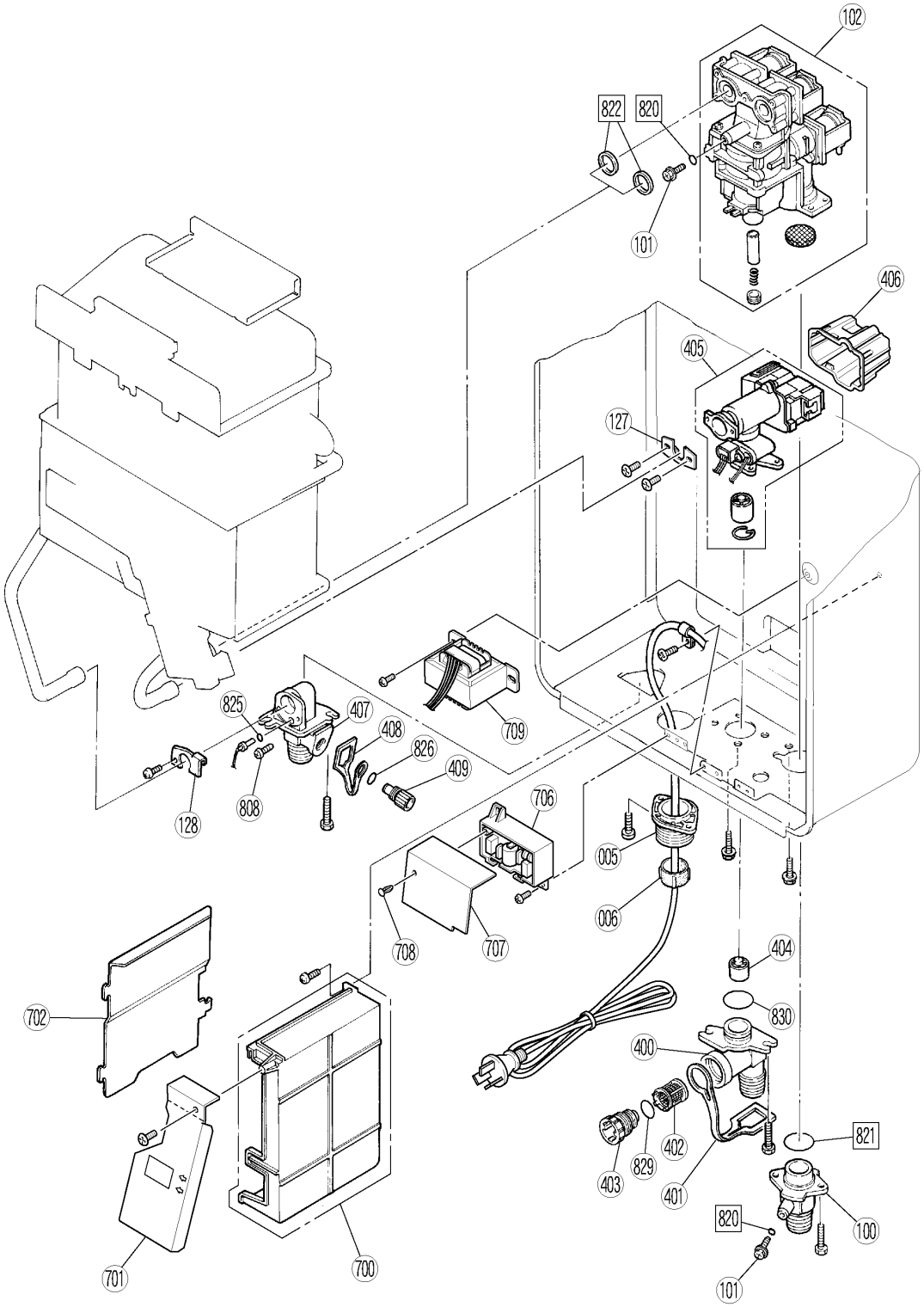
Infinity 16e and 20e



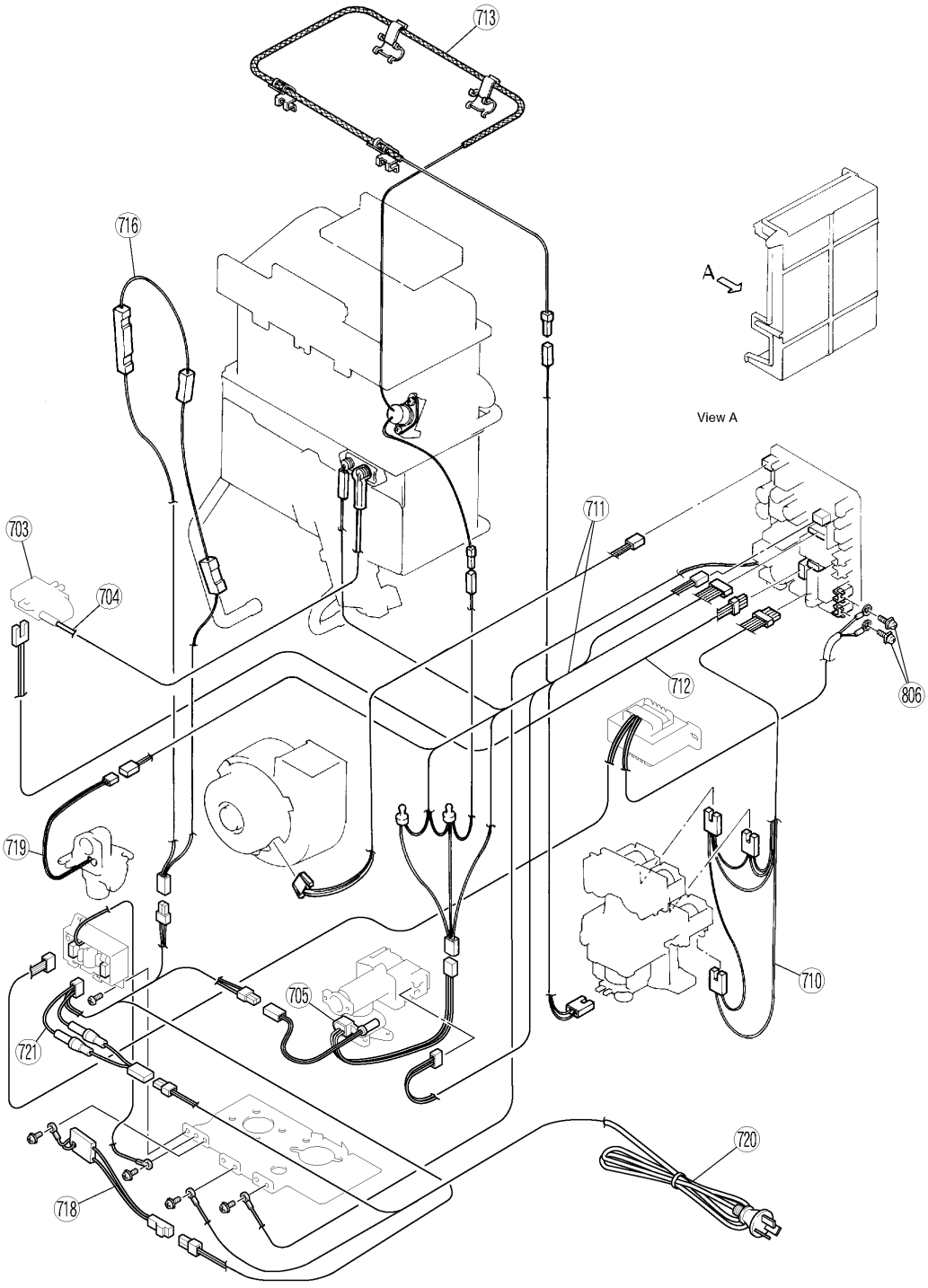
Infinity 16e and 20e



Infinity 16e and 20e



Infinity 16e and 20e



21. Parts List

16e on page 46

20e on page 52

16e

No.	PART NAME	RJ DRAWING No.	RUK PART No.	QTY
001	PANEL Assy, Front	U250-120-7-C		1
002	BRACKET, Wall Mount.	BU195-121		2
003	PANEL, Fr	U250-165		3
004	PLUG	AU105-113		1
005	GROMMET, Cable	BU56-602-N		1
006	GASKET, Cable	U250-1560		1
100	CONNECTION, R3/4 Gas	CU195-211		1
101	SCREW, TP. Seal	C10D-5		2
102	CONTROL, Gas	C36E-45-S		1
103	MANIFOLD 'A' Assy (Prop.)	U250-210-A		1
103	MANIFOLD 'B' Assy (NG)	U250-210-B		1
104	GASKET, Manif. Upr	U250-218		1
105	GASKET, Manif. Lwr	U250-219		1
107	BURNER CASE, Fr	U250-331		1
108	GASKET, Burner	U217-313		1
109	DAMPER	U250-334		1
111	BURNER CASE, Rr	U217-312		1
112	FRONT PLATE, Comb. Cmbr	U217-306		1
113	SEALING UPPER, Comb.Cmb	U217-307		1
114	ELECTRODE	H73-120		1
115	ELECTRODE, FR	U250-295		1
116	GASKET, Electrode	AH66-398		1
117	HOLDER, Electrode	AH66-393		1
118	SLEEVE, Electrode	AU206-218		1
125	HEAT EXCH. Assy	U250-915-S		1
127	BRACKET A	U222-703-2		1
128	BRACKET B	AU195-321		1
130	TERMINAL, Flue	U217-405-2		1
131	GASKET, Flue Term	U217-406		1
132	PACKING, Flue Term	BH29-486-I		1
150	FAN MOTOR, Assy	U250-555		1
151	FAN CASING, Assy	CU169-552		1

20e

No.	PART NAME	RJ DRAWING No.	RA PART No.	QTY
001	BODY Assy, Main	U250-120-7-A		1
002	BRACKET, Wall Mount.	BU195-121		2
003	PANEL, Fr	U250-165		3
004	PLUG	AU105-113		1
005	GROMMET, Cable	BU56-602-N		1
006	GASKET, Cable	U250-1560		1
100	CONNECTION, R3/4 Gas	CU195-211		1
101	SCREW, TP. Seal	C10D-5		2
102	CONTROL, Gas	C36E-45-S		1
103	MANIFOLD 'A' Assy (Prop.)	U250-210-A		1
103	MANIFOLD 'B' Assy (NG)	U250-210-B		1
104	GASKET, Manif. Upr	U250-218		1
105	GASKET, Manif. Lwr	U250-219		1
107	BURNER CASE, Fr	U250-331		1
108	GASKET, Burner	U217-313		1
109	DAMPER	U250-334		1
111	BURNER CASE, Rr	U217-312		1
112	FRONT PLATE, Comb. Cmbr	U217-306		1
113	SEALING UPPER, Comb.Cmbr	U217-307		1
114	ELECTRODE	H73-120		1
115	ELECTRODE, FR	U250-295		1
116	GASKET, Electrode	AH66-398		1
117	HOLDER, Electrode	AH66-393		1
118	SLEEVE, Electrode	AU206-218		1
125	HEAT EXCH. Assy	U250-915-S		1
127	BRACKET A	U222-703-2		1
128	BRACKET B	AU195-321		1
130	TERMINAL, Flue	U217-405-2		1
131	GASKET, Flue Term	U217-406		1
132	PACKING, Flue Term	BH29-486-I		1
150	FAN MOTOR, Assy	U250-555		1
151	FAN CASING, Assy	CU169-552		1

20e

No.	PART NAME	RJ DRAWING No.	RA PART No.	QTY
400	CONNECTION 1/2, In. Water	H73-500		1
401	STRAP, Plug	U250-631		1
402	FILTER, Inlet Water	H73-511		1
403	FILTER, Plug	H73-510		1
404	RECTIFIER	M8D1-15		1
405	SERVO, Water Flow	M8E-4-11-A		1
406	COVER, Water Flow Sy.	U250-530		1
407	CONNECTION, 1/2 HW	U217-441		1
408	STRAP, Plug	AU129-526		1
409	DRAIN VALVE, Assy	BU129-520-C		1
700	PCB, Assy	U250-1600		1
701	COVER-A, EC	U250-1605-A		1
702	COVER, EC	U250-507		1
703	SPARKER	EI-144		1
704	LEAD, High Tension	BH38-710-240		1
705	MR SENSOR, Assy	M8D1-10-4		1
706	EMC BOARD, Assy	U250-1602		1
707	COVER, EMC Board	U250-1625		1
708	CLIP	CP-90200		1
709	TRANSFOMER, Assy	ET-293		1
710	HARNESS, Solenoid Valve	U250-604		1
711	HARNESS, Sensor	U250-603-2		1
712	HARNESS, Breaker	U250-1610		1
713	HARNESS, Thermal Fuse	U250-611		1
714	HOLDER, Thermal Fuse	U217-676		2
715	HOLDER, Thermal Fuse	U250-670		2
716	VALVE HEATER	U250-1550		1
717	BRACKET, Heater	AU100-721		4
718	SENSOR SWITCH, Low Temp	H73-750		1
719	THERMISTOR, Inlet	BH45-650		1
720	SWITCH, Low Temp.	CP-90491T		1
721	HARNESS, Fuse	U250-1612		
721	HARNESS, Fuse	U250-1612-2		1

20e

No.	PART NAME	RJ DRAWING No.	RA PART No.	QTY
801	SCREW	CP-30583		2
802	SCREW	ZFDB0408UK		2
803	SCREW	CP-30580		3
804	SCREW	CP-30586		1
805	SCREW	CP-21478-412		3
806	SCREW	U217-510		2
807	SCREW	CP-80452		1
808	SCREW	U217-449		1
820	O-RING	M10B-13-4		2
821	O-RING	M10B-1-24		1
822	WASHER	C36E1-6		2
825	O-RING	M10B-2-4		1
826	O-RING	M10B-2-7		1
827	O-RING	M10B-2-12.5		1
828	O-RING	M10B-2-14		1
829	O-RING	M10B-2-16		1
830	O-RING	M10B-2-18		1
888	CUSTOMER INST.	U250-1630		1
889	INSTALLATION INST.	U250-1645		1

Notes

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